

Colonial Legacy of Gender Inequality: Christian Missionaries in German East Africa

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Colonial Legacy of Gender Inequality: Christian Missionaries in German East Africa*

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Abstract

Why does sub-Saharan Africa exhibit the highest rates of gender inequality in the world? This article evaluates the contributions of Christian missionary societies in German East Africa to current socioeconomic gender inequalities in Tanzania. Previous studies ascribe a comparatively benign long-term effect of missionary societies, in particular of the Protestant denomination, on economic, developmental, and political outcomes. This article contrasts that perception by focusing on the wider cultural impact of the civilizing mission in colonial Africa. The analysis rests on a novel georeferenced dataset on German East Africa—based on digitized colonial maps and extensive historical records available in the German colonial archives—and the most recently available DHS-surveys. The results highlight the formative role of Catholic missionary societies in German East Africa in shaping gender inequalities currently witnessed in Tanzania.

Keywords

colonialism, German East Africa, Africa, gender inequality, Christian missionaries

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Recent studies have given ample credit to the comparatively benign effects of Christian missionaries, in particular protestant missionaries, on current educational outcomes and associated development benefits in former European colonies. Missionaries' educational campaigns propelled human capital formation of the local population, triggering the intergenerational transmission of both knowledge and aspirations for education, which manifested in persistent effects on current outcomes and significant spillovers to the regional and national level.¹ Furthermore, the "social benefits" of education contributed to comparatively better political outcomes, such as increased support for democracy and religious liberty, and higher economic growth rates.² While this perspective partly acknowledges missionaries' lasting transformative impact on local cultures, it rests on a relatively narrow view of the nature of missionary education and activity. Although the majority of Christian missionaries were not directly associated with the colonial state, many of them functioned as quasi-colonial agents and incubators of Western norms and values. Guided by the notion of the "*mission civilisatrice*," missionaries viewed themselves at the vanguard of the "spiritual conquest" aimed at uplifting the civilizational status of the indigenous population. In fact, these ambitions formed one of the core reasons for missionaries' emphasis on the provision of education, which served as a tool and an incentive for religious conversion and cultural adaptation to a Christian life style.

The relevance of religious and cultural values for long-run human capital and economic development has attracted considerably more attention in studies focusing on the industrialized world. Building on Weber's seminal work on the Protestant work ethic,³ it is frequently argued that the rise of Protestantism coincided with the spread of mass education and behavioral traits more conducive to generating wealth. For example, Becker and Woessmann⁴ find that Protestantism is associated with higher economic prosperity in late nineteenth-century Prussia because it generated substantially higher literacy rates. Similarly, Woodberry,⁵ taking a global view, argues that Protestantism propelled development and democracy, also as a result of its catalytic influence on mass education. While others, such as Delacroix and Nielsen,⁶ dispute the widely held assumption that Protestantism is correlated to economic prosperity, strong agreement exists on the notion that religious and cultural factors are related to behavioral traits that matter for long-term development.⁷

Keeping this in mind, I therefore turn to a relatively understudied topic in this context: the impact of these considerations on gender roles in the precolonial societies. The Western conceptualization of gender roles and hierarchies, highly conservative by our current understanding, formed an intrinsic aspect of the cultural package missionaries were attempting to impose. The highly negative effect of the colonial era on women's socioeconomic and political position is well documented,⁸ but the contribution of Christian missionaries has, to date, received relatively little scholarly attention. This is surprising when we consider that gender inequality continues to pose a grave impediment to economic and human development in sub-Saharan Africa.⁹ Furthermore, the lack of substantial progress on the issue in recent decades, despite its being a UN Millennium Development Goal, indicates that gender norms—and associated attributes, opportunities and relationships that are socially constructed and learned through

socialization—are deeply entrenched within societal and political structures. Consequently, it is necessary to extend the scope of analysis to incorporate factors that have historically shaped the salience of social structures and gender roles in Africa.

The general picture that emerges from extant studies is relatively mixed. Some claim that Christian missionaries had a positive effect on women's emancipation through the provision of education—either directly or as a downstream benefit—which offered opportunities for women to “escape social control” and improved the possibility of labor market participation.¹⁰ Such findings are restricted mostly to Protestant missionaries, who invested more in female education than their Catholic counterparts, as a recent paper by Nunn demonstrates.¹¹ By contrast, the gender-biased education provided by Christian missionaries is credited with isolating women in the domestic realm, severely damaging their public position and opportunities for empowerment, and providing one of the most critical determinants of persistent gender inequality in the region.¹² Nevertheless, the majority of these studies are focused on the British colonial realm, which exhibited considerable idiosyncrasy, in particular with regard to the strong influence of Protestant missionaries in the educational sector.¹³

This article investigates the contribution of Christian missionaries to the current structure of gender inequality in Africa by shifting the lens on the localized impact of missionary stations in Tanzania, formerly a part of German East Africa. The role of women in African precolonial societies, including today's Tanzania, was far from uniform. Yet women often played a central role in production and the household, especially in agriculture-based societies, and matrilineal systems were a prominent feature.¹⁴ Colonial intervention deeply upset the formerly prevailing conceptualization of the gender-based division of labor, social, and political tasks.¹⁵ For example, matrilineal institutions came under attack during colonial rule because of the Christian missions' promotion of the patriarchal nuclear family and government policies' assumption of male-headed households.¹⁶ Furthermore, in a symbiotic relationship with the colonial administration, missionaries relied on the administration's protection to achieve their proselytizing ambitions, while in turn molding the native population into a labor force ready to be exploited by the metropolis. Thus, morals and norms promoted by missionaries permeated the local cultures subjected to the their influence.¹⁷ While it is irrefutable that the colonial period deeply transformed social and political organizations, including gender roles and hierarchies, it goes without saying that the history of Africa did not start with colonialism.¹⁸

Building on a novel georeferenced dataset constructed from archival sources on the German colonial period, I analyze the relationship between historic exposure to different Christian missionaries and current educational outcomes. This study demonstrates that Catholic and Protestant missionaries, contrary to previous studies, contributed to an almost equal degree to higher levels of educational attainment. However, I also find that women's socioeconomic status, proxied by educational attainment, is lower than men's in regions with a higher exposure to Catholic missionary activity. Further tests reveal that those results are not restricted to individual missionaries and are driven by German Catholic missionaries. This study thus corroborates previous findings on the relevance of intergenerational transfer of colonial legacies, in particular with regard to

educational outcomes and the persistence of norms.¹⁹ Furthermore, this study transcends the often narrow focus on economic growth rates, a frequent feature in research on colonial legacies, by analyzing the variable and localized impact of colonialism on a cultural and social dimension. Finally, it provides the first empirical analysis of the German colonial empire's long-term effect, which to date remains vastly understudied in contrast to other European colonial empires.

The article is structured as follows. The next section provides an overview of the literature on the legacies of Christian missionary societies and colonial regimes with regard to gender inequality, highlighting shortcomings and knowledge gaps. Second, the overarching hypotheses of this study and their underlying rationale are outlined. Third, I present the historical case and provide a detailed account, supplemented by evidence from primary sources, of the role of Christian missionaries in the colonial system, the structure of colonial education, and gender-related considerations. The fourth section provides an extensive discussion of the data collection process and the operationalization of the core variables. The remaining sections test the hypotheses in an incremental manner and contextualize the findings in the wider context of the literature and the empirical case.

Literature Review: The Christian Mission and Development

The colonial state's primary objective was the consolidation of claimed territory followed by economic extraction.²⁰ Human capital building and the imposition of cultural policies were thus left to Christian missionaries, who became an integral part of the colonial system. Increasingly, evidence of the long-term effects of the historic presence of European missions on economic and political development has emerged in the wider context of the literature on colonial legacies and economic development. Nathan Nunn²¹ shows that, in Africa, missionaries had a lasting impact on local culture, as descendants of those exposed to missionaries are more likely to identify as Christian today. At the country level, Woodberry²² documents a positive relationship between measures of the historical presence of missionaries and current per capita income and democracy across former nonsettler colonies. In his view, and that of many others,²³ the Christian mission had benign long-term effects, as it was the first provider of "Western" education in Africa. Education became valued as a tool of modernization, access to the socioeconomic and political elite in the new colonial hierarchy, and improved quality of life.

Established institutions were maintained as missionary, and later public, schools;²⁴ education was embedded into culture and passed on from generation to generation and through human capital externalities.²⁵ It has been argued that groups that had higher exposure to missionary activity during the colonial period now have significantly higher levels of education,²⁶ income,²⁷ political participation,²⁸ and institutional development.²⁹ Similar findings have also been produced outside the African context. Mantovanelli reports a positive effect of Protestant missions on Indian literacy;³⁰ Lankina and Getachew find a positive effect of Christian missions in India on current

educational attainment, social activism, and democracy;³¹ Bai and Kung and Chen, Wang, and Yan find positive effects on Chinese economic performance;³² and Caceido finds positive effects from Jesuit missionaries in South America.³³

These studies however generally suffer from two fatal shortcomings. First, missionaries are frequently reduced to educational service providers with a humanistic motivation and a high degree of autonomy from the colonial state. That view largely ignores the fundamental quest of missionaries—to proselytize and civilize foreign cultures through education—and their symbiotic relationship with the colonial system. Second, the narrow focus on education and related formal and cultural institutions as the sole long-term effects essentially ignores the larger cultural impact that missionaries had on sociopolitical hierarchies and cultural behavior.³⁴ Okoye, for example, shows that missionaries actively subverted traditional institutions and that members of ethnic groups exposed to greater missionary activity developed increases in uncooperative behavior and have significantly less trust today in relatives, neighbors, members of the same ethnic group, and other individuals.³⁵ This casts serious doubt on the ascribed benefit of historic exposure to missionaries and their schooling. Finally, missionary education, assuming that it does have a positive effect on today's educational level, was neither "available" to everyone falling under a mission's jurisdiction nor homogeneously provided to everyone at the same school. Rather, missionaries' preferences for certain religions, ethnic groups, and genders were reflected both in deciding to whom to provide education and in their curricula. The effects were particularly evident for women, who were less numerous and received a different education, aimed at creating Christian housewives, from their male counterparts in many schools.

Colonialism and Gender Inequality

Gender inequality poses a severe impediment to economic and human development in Africa and the entire world. Yet in Africa the differences between genders on the economic, social, and political dimensions are particularly pronounced. Whereas much has been written about the effect of these grievances,³⁶ relatively little empirical work has concerned itself with unfolding its historic roots. Gender roles are time and context specific and have evolved constantly according to changing conditions. Without doubt, gender inequality and female disempowerment, in terms of the limited social and physical mobility, already existed to varying degrees in African cultures before the arrival of missionaries and colonizers.³⁷ A highly elaborate study by Alesina, Giuliano, and Nunn corroborates this argument.³⁸ They find that agricultural practices influence the origin of traditional gender norms and that societies that traditionally relied on plough agriculture have a higher degree of gender inequality.

Other studies have highlighted the socioeconomic and political transformation induced by the historical shock of colonialism as the primary driver of historic gender inequality in Africa. Coquery-Vidrovitch describes the colonial period as a "patrilineal offensive,"³⁹ which significantly decreased female empowerment through the gradual abolition of matrilineal society structures and the importation of European legal traditions that favored men. Boserup argues also that the marginalization of women in Africa

is largely rooted in colonial times. She observed that, in most countries in the region, formal sectors during the colonial era and following independence were primarily reserved for men, while women were engaged in informal work. She hypothesized that women were actively discouraged from entering formal employment because African men “loathed the idea of their wives and daughters working under the authority of a foreign man.”⁴⁰ Extending this argument, Akyeampong and Fofack argue that since precolonial, male-dominated politics did little to correct the colonial imbalances, today’s marginalization of African women is a legacy from colonial times.⁴¹

Such views contrast greatly with findings from the very few studies that have attempted to measure the historic effect of missionaries on gender-related topics. Nunn, using colonial data and Afrobarometer data, finds a positive effect of missionaries, in particular protestant missionaries, on current female educational attainment in Africa.⁴² Though the data indicate a positive relationship between historic exposure to missionaries and gender equality, they do not suffice to formulate a comprehensive argument on the role of colonial missions on current levels of gender inequality. Meier zu Selhausen and Weisdorf carefully evaluate detailed Protestant marriage registers in Kampala, Uganda, and determine that gender inequality grew at the advent of the colonial period, but had subsided to precolonial levels at the time of independence.⁴³ Nevertheless, the transferability of their results is questionable because of the restricted focus on one urban setting in Uganda. Outside Africa, Lankina and Getachew find that Christian missionary activity is consistently associated with better female educational outcomes in both the colonial and postcolonial periods.⁴⁴

I contribute to the literature in several ways. Most work done in Africa has either excluded former German colonies from its samples or treated them as part of the empire that succeeded Germany as colonial ruler after World War I. From information contained in the German colonial archives I have been able to construct a comprehensive dataset that allows me to analyse the long-term implications of Christian missionaries for development outcomes and gender inequality with an unprecedented degree of nuance. Furthermore, the expulsion of many German missionaries following the end of the war, reducing the number of active missionary stations in the British colonial period to roughly half their previous number, provides the opportunity to test for grounds of persistence of potential long-term effects.

Hypotheses: Colonial Missionaries and Gender Inequality in Tanzania

Extant literature clearly demonstrates that the legacy of Christian missionaries in colonial Africa on educational outcomes and beyond is still visible today. Commonly, this legacy manifests in comparatively benign effects on education and, also as an extension of education, a wide range of social, economic, and political outcomes. These findings are however often ascribed to Protestant missionaries. Yet missionary schooling contained a strong twofold gender bias. First, the schooling structure embodied the gender preferences of missionaries, so that women received both less and different education from men, with the ultimate aim of preparing them for life as Christian

housewives. Second, missionary societies had the overarching ambition to “uplift” indigenous populations by aligning local cultures with the Western notion of “civilization,” which contained clear prescriptions on gender roles. Considering the palpable legacy of missionary education in Africa, I argue that these structural gender biases resulted in the currently observable differences in men’s and women’s socioeconomic status.

Gender inequality is, of course, a complex phenomenon that creates grievances across multiple dimensions. In combination with the subtleties and measurement problems of some of its expressions, this significantly impairs a holistic analysis of Christian missionaries’ contribution to it. However, the gender gap in educational attainment and literacy is both measurable and indicative of structural gender biases. Educational attainment generally reflects socioeconomic standing and can be viewed as a second-best measure for gender inequality because of its implications as an “enabling factor” and a “source for empowerment.”⁴⁵ Hence the gender gap in educational attainment, in multiple specifications, functions as proxy for the contribution of Christian missionaries to current gender inequality.

Missionary societies, although sharing considerable similarities, were far from homogenous. Previous research shows that their differences translated into differential long-term effects across the board. Notably, it appears that the comparatively benign effects of Christian missionaries are predominantly driven by Protestant missionary societies. Building on this logic, I expect to find differential legacies of gender inequality dependent on the denomination of missionary societies. Furthermore, several studies demonstrate the importance of intergenerational transmission of knowledge and norms for the persistence of colonial legacy effects.⁴⁶ The case of German East Africa, containing a historical idiosyncrasy in the form of the external shock to missionary activity as a result of WWI, allows me to test for the relevance of this particular mechanism.

Historical Context: German East Africa

The colonization of German East Africa, which comprised the current states of Tanzania, Burundi, and Rwanda, occurred relatively late in the imperial era. In 1884, the notorious Carl Peters undertook a series of expeditions throughout East Africa, during which he signed obscure treaties (*Schutzverträge*)⁴⁷ with what he assumed to be local authorities that transferred their land “for all times” to the German East Africa Company (*Deutsch Ostafrikanische Gesellschaft*, or DOAG).⁴⁸ In response to so-called Abushiri Revolt in 1888 (*Aufstand der Ostafrikanischen Küstenbevölkerung*),⁴⁹ which resulted from the DOAG’s heavy interference in political and economic affairs along the coast, the German government integrated the East African territories into the empire and established full-scale colonial rule.⁵⁰ However, because of a lack of staff and resources, military control and civil bureaucracy were spread thinly across the territory, and were mainly confined to some local hubs of state presence.⁵¹

Violent resistance and repression was endemic to the colonial subjugation project, but reached an unprecedented level with Maji-Maji rebellion in the southern and

coastal areas of German East Africa in 1905.⁵² After brutally crushing the rebellion within a year, the German administration finally managed to consolidate its rule thanks to the local population's immense fear of the German military apparatus and the installment of loyal chiefs in the rebellious districts.⁵³ Political stability was short-lived, however, as the outbreak of WWI in 1914 engulfed the majority of the territory in warfare and resulted to the cessation of all German colonies in 1919.

The Christian Mission in Tanganyika

Christian missionaries were a fundamental catalyst for the expansion of European influence since the beginning of the colonial period. However, with the onset of a more coordinated and excessive forms of colonialism in the mid to late nineteenth century, an increasing number of Europeans took to the civilizing mission, that is, the perceived duty of the civilized to "civilize" and "Christianize" primitive, pagan, and barbaric people.⁵⁴ In the territory that was to become German East Africa, only a handful of mostly British and French missionaries had been active before 1880, as a result of its relatively remote location and marginal experience with European colonizers. With the beginning of increased German activity in the region, private entrepreneurs of the DOAG established stronger ties with missionary societies in Germany to add further manpower to their endeavor and increase their political leverage with the German government. Thus, the vast majority of missionary stations active in German East Africa were established after 1884, cooperated relatively closely with the colonial administration, and became vital components in the strategic infrastructure of the nascent colonial regime.

Contemporary missionary societies considered themselves the vanguard of the spiritual conquest of the indigenous population and intended to mold citizens according to both Christian and German ideals. The primary instrument for this endeavor was the provision of schooling, which offered the opportunity to merge the transmission of knowledge with cultural and religious teachings. In addition, missionaries came to the colonies with a high degree of experience in education and, as providing education was not a priority of a colonial administration more concerned with establishing territorial control, were able to fill the educational vacuum.⁵⁵ Within a few years missionary stations became the sole provider of Western formal education in German East Africa. Hence, formal education, literacy skills, and the general formation of human capital were, as in the majority of African colonies until the 1940s, entirely attributable to mission schools.⁵⁶

The German colonial administration, which did not establish any schools for the indigenous population until the very end of the German colonial period, abstained from interfering excessively with missionary schools curricula or teachings. However, it provided incentives and certain guidelines in order to ensure that missionary activity was aligned with the overarching interests of the colonial regime. Essentially, the central administration successfully attempted to convince missionary societies to function as "national missions," promoting German values and to shape a labor force ready for exploitation or introduction in the colonial administration.⁵⁷ Furthermore, both the colonial administration and missionaries were concerned about the spread of Islam

from Zanzibar to the coastal areas of mainland Tanzania, which posed a direct threat to their perceived territorial, religious, and cultural superiority. As a result, the German colonial administration offered monetary rewards to missionary stations for each Christian pupil that entered civil service after graduating from a missionary school following the rationale to “avoid anything that inhibits the spread of Christianity or supports Islamic teaching.”⁵⁸ In effect, missionaries became an indispensable means to the hearts of the indigenous and “function[ed] almost exclusively in the interest of the colonial policy . . . as they contributed to the introduction of European culture to Africa, which created a favorable fundament for the political colonization and economic exploitation.”⁵⁹

Thus, missionary education has to be viewed in the light of these underlying intentions and not simply as the primary tool for the transmission of western knowledge to the local population. This becomes painfully clear on a closer look at the structure of missionary schools and the content of contemporary curricula. Basic subjects, such as reading, writing, and math, were taught at every missionary school to varying degrees. Often, however, the most prominent features of the school day were religious education and vocational training, with an emphasis on introducing “chastisement and order, punctuality and obedience, cleanliness and discipline.”⁶⁰ In fact, missionary societies understood it as their fundamental task to “indoctrinate a working ethos” (*Erziehung zur Arbeit*) amongst the “lazy” (*faul*) indigenous population.⁶¹ Missionary societies were thus compelled to “primarily push for behavioral education, not for the transmission of knowledge.”⁶² Notably, however, the highest level of this process was not the attainment of personal freedoms or economic opportunities, but “Christian culture,” which would enable the indigenous population to contribute to economic production.⁶³

Prior research on missionary schools in the colonial system has established an observable positive relationship between the exposure to missionary education and current levels of education; but the cultural aspects embodied in colonial education have received considerably less attention. That educational system included attacks on local customs and institutions, generally labeled “pagan behavior,” and overtly attempted to substitute contemporary Western cultural norms and ideals. An intrinsic aspect of that mission was to transform gender roles in a way deemed more compatible with Western civilization.

Women in Missionary Stations

Precolonial Tanzanian societies consisted of a number of different cultural groups (around 130) that mostly subsisted on hunting and gathering or low levels of subsistence agriculture and pastoralism.⁶⁴ The division of labor and functions between genders varied considerably from group to group and, although women only rarely held strategic political positions, they often played a central role in the societal structure.⁶⁵ Apart from performing vital farming tasks, they played a key role in trade and were able to command their own possessions according to their free will.⁶⁶ This situation stood in sharp contrast to the relatively homogenous perception of social organization with regard to men and women held by Christian missionaries, both Catholic and Protestant, which was heavily influenced by contemporary Western European ideals.

The appropriate role for women in German society during this period was as “Christian stay-at-home wife” who supported the male breadwinner and raised the children. This ideal was reflected in the dismal level of women’s legal status, which barred them from voting or standing office, allowed them to attend university only at the turn of the century, did not provide gender equality in marriage, and did provide for full property rights.⁶⁷ The establishment of these conditions formed a vital part of missionaries’ attempt to “culturally uplift” and “civilize” the indigenous population in the colonies.⁶⁸ Extensive attention to this particular cultural aspect was driven, in part, by the missionaries’ conviction that women among the indigenous population were slaves of their husbands and “trade objects,”⁶⁹ which arose from their high disdain for the “pagan” practice of polygamy and was frequently used to justify missionary activity and to attract further funding from the metropolis.⁷⁰ Moreover, in their attempt to engage in “building the character and heart” of the local population by promoting concise and restrictive gender roles, they hoped to establish Christian families and villages to serve as incubators for the proliferation of the Christian colonial order.⁷¹

Those ideas are reflected in the interaction of missionaries with the local population in general and the structure of missionary education in particular. Within missionary schools, three major differences between the educational experiences of boys and girls can be identified. First, missionaries preferred the education of men to women, as women made up only 33 percent of the student body at the time. The teaching body, also, consisted primarily of men.⁷² Second, missionaries’ educational system was inherently gender-biased. Women were supposed to be able to read and write at the time of baptism, but the required level of skill and knowledge was generally very low. Other subjects, such as math, were often taught only to a rudimentary degree to girls at the time.⁷³ Vocational training, which, as mentioned before, was a vital aspect of missionary education, differed enormously for boys and girls. Whereas boys were taught in agricultural and trade skills, vocational training for women consisted of domestic skills, such as sewing and knitting, and behavioral as well moral education on how to be a housewives.⁷⁴ A report on a missionary school in the Bagamoyo District from 1902, for example, states that “girls were trained by sisters to perform the house-keeping tasks relevant to their social status.”⁷⁵ It should be noted that this type of gender bias in missionary education was not restricted to German East Africa, but can be observed across the majority of former African colonies.⁷⁶ Missionary activity in German East Africa contributed to the proliferation of gender inequalities by trying to inject a religiously influenced German ideal of gender roles in the indigenous population. The factors driving the process were both the specific assignment to certain tasks and the preferential treatment of men, which promoted their dominant sociopolitical position. However, as mentioned before, gender biases were present in at least some local cultures before the arrival of German missionaries.

Denominational Differences regarding the Role of Women

Christian missionaries, albeit sharing similar motivations, principles, and beliefs, were not a homogenous group. Differences can be observed primarily along denominational

lines, as German East Africa hosted missionaries belonging to the Catholic, Protestant, and Anglican churches, though the latter had only a marginal impact because of a limited number of stations. Catholics and Protestants entered at similar time periods and with similar promises, namely the opportunity of gaining fresh converts to their divine cause, to bring (European) "civilization" to the underprivileged indigenous population, and to receive additional funding from public and private sponsors in Germany. Similarly, education played a fundamental role in their strategic operations and was equally influenced by the prevailing social order in Germany. In spite of these similarities, three notable differences with regard to the *modus operandi* between these denominational groups need to be emphasized, as they may directly relate to the historical experience and long-term trajectory of individuals exposed to missionary activity.

First, Catholic missionaries took a more aggressive approach to proselytization, targeting the masses and pressuring local people to get baptized. Protestant missionaries, while recognizing the need for creating Christian communities, aimed to convert individuals who had demanded baptism themselves.⁷⁷ This fact is reflected in the relatively higher number of Catholic converts (approximately 71,000) to Protestant converts (approximately 15,000) in 1913.⁷⁸ This difference mediated notably different engagements with local customs: Protestant missionaries, although aiming to establish Christian communities themselves, were comparatively more hesitant to meddle with the life style and traditions of the indigenous population; Catholic missionaries desired to create Christian communities closely resembling their European ideal.⁷⁹

Second, contemporary Catholicism did not officially recognize the principle of religious liberty and advocated the use of Latin in worship and scripture reading.⁸⁰ In contrast, Protestants emphasized literacy in their curricula in order to enable "people to read the Scriptures in their own language."⁸¹ Finally, Catholic missionaries neither had wives nor, in most cases, interacted directly with the female student population at missionary schools. In fact, most of the female education at Catholic missionary schools was conducted in cooperation with sister orders.⁸²

Cultural Transformation and the Persistence of Norms

The persistent effect of certain historic events, in particular colonization, has been demonstrated to manifest through several avenues, both internal and external to the individual. Colonial education has been documented to alter local cultures by shaping persistent norms, in particular in the form of higher educational aspirations in the choices made by the later generation affected by colonial education.⁸³ This effect could simply be the result of an exposure to formal education in general. Colonial education is inseparable from the nature of missionary stations as cultural incubators of a Western belief system. Nevertheless, denominational differences in belief systems are, as mentioned before, reflected in missionary activity and educational preferences.

Hence I argue that Christian missionaries' worldview and the preference structure of colonial missionaries affected the proximate population, which experienced a shift in culture, sociopolitical hierarchies, and traditional practices that has been transmitted from generation to generation to this day. Considering the importance attached to the

gender roles and gender preferences of Christian missionaries, I argue that this cultural shift manifests a negative effect on gender equality, at least on the socioeconomic dimension.

Data and Measurement

Via geospatial analysis, I examine the long-term effects of German missionaries on gender inequality in Tanzania, by testing whether regions with a higher exposure to missionary activity have a higher gender gap in education and skilled employment. The data used in the analysis consist of a variety of sources from the colonial and modern period and are built around the most recently available surveys by the US AID Demographic and Health Services Program (DHS) in Tanzania. Nationally standardized questionnaires, focusing on health-related indicators, also measure a variety of socioeconomic characteristics among a random sample that is representative at a highly geographically disaggregated level. The standardized measurement procedures applied to surveys under this program allow me to merge the DHS from 2010⁸⁴ with the AIDS Indicator Surveys (AIS) from 2007–9 and 2011–12⁸⁵ to construct a georeferenced dataset consisting of 48,303 unique observations for individuals ranging from fifteen to sixty-five years of age.⁸⁶ As these surveys were conducted in village clusters, I use individuals nested within these clusters as my unit of analysis. Summary statistics of all relevant variables can be found in Appendix A1.

I use two different outcome measures in an attempt to capture the complex and multifaceted nature of gender inequality on the socioeconomic dimension. All of these are taken from DHS program's surveys. (I) *Years of education* is a continuous variable capturing a respondent's years of education. (II) *Literacy* is a binary variable measuring a respondent's ability to read and write at medium level. Literacy rates and educational attainment are widely used to measure of human capital and serve as an indicator for individual's socioeconomic standing and ability to access employment opportunities. Unfortunately, representative estimates on educational outcome and literacy rates are not available prior to the current time. Furthermore, only one of the surveys, DHS 2010, contains the literacy variable, hence reducing the number of respondents for this analysis.

"Treatment" Measurement: Exposure to Missionary Education

The analysis relies on a geographical distance measure between observations and missionary stations. Information on the location and characteristics of missionary stations was obtained from primary sources and thematic maps from the colonial period (see Figures 1 and 2). The report produced by the German mission inspector Martin Schlunk⁸⁷ on a commission from the Colonial Institute of Hamburg (*Hamburgisches Kolonialinstitut*) contains the location every active missionary station and colonial school in German East Africa. In addition, it contains a rich host of statistical information on both the missionary staff (e.g., gender, education, race) and pupils (e.g., gender, faith, ethnicity). Although Schlunk himself admits that certain information is

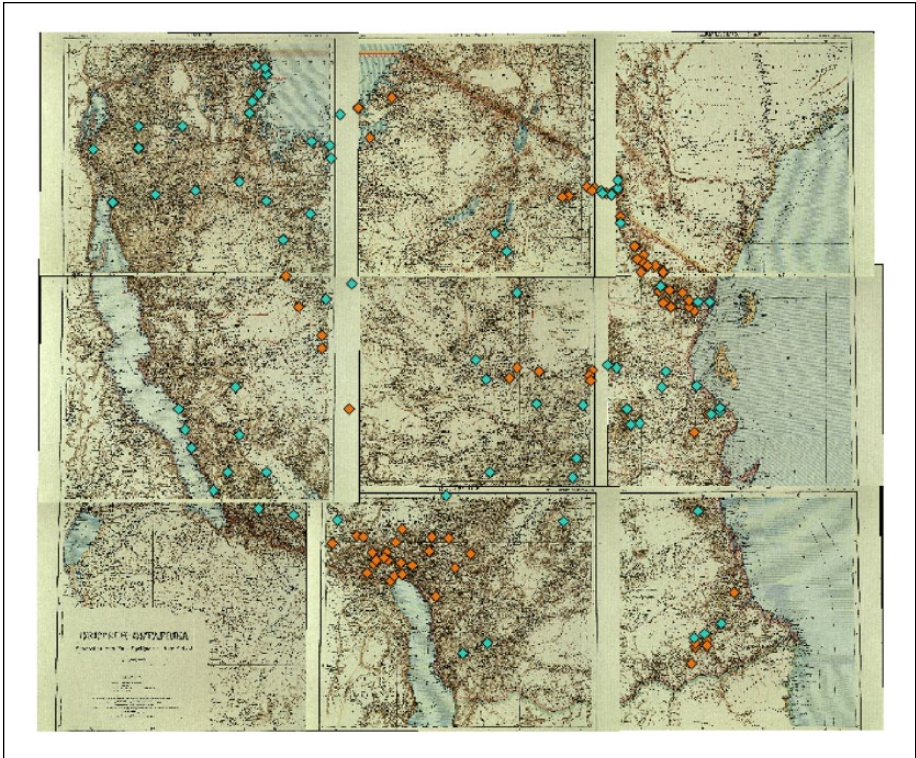


Figure 1. Map Displaying the Location of All Protestant (Red) and Catholic (Green) Missions in German East Africa in 1914.

Note: This map includes missionary stations in today's Rwanda and Burundi, which were omitted in the analysis. See online version of this article to view figure in color.

Source: Sprigade and Moisel, *Der Grosse Deutsche Kolonialatlas 1920*; Schlunk, *Das Schulwesen in den Deutschen Schutzgebieten*.

missing,⁸⁸ the book paints an almost complete picture of the conditions at missionary schools and is the most reliable source of information.

This information is compounded by geographic information from a number of thematic maps produced by the colonial government and various other institutions (such as colonial or missionary societies). The maps display, among other things, the physical features of the colonial presence in German East Africa and internal district and religious borders. I have scanned and georeferenced these maps and extracted relevant information using GIS software (QGIS 2.10.1).⁸⁹ The maps used for the analyses presented below displayed longitude and latitude information, allowing comparably reliable georeferencing. For the main analysis, I have assigned relevant information to specific geographic locations using a geocoded reference map produced with high-resolution scans of the German Colonial Atlas published in 1920 as well as a complete village and location register that accompanies the atlas.⁹⁰

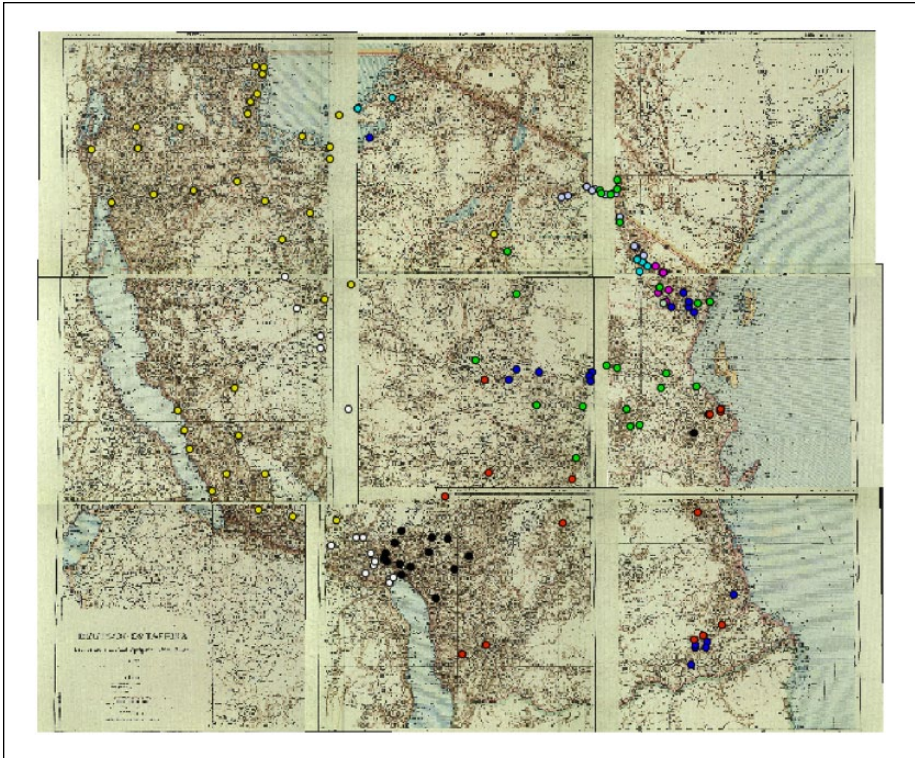


Figure 2. Location of All Missions.

Note: Colors indicate the respective missionary societies. Catholic missionaries represented the Holy Ghost Fathers (green), White Fathers (yellow), St. Ottilien (red); Protestants were represented by the Berlin Missionary Society (black), the Bruedergemeine in Herrnhut (white), the St. Anton Generalkonferenz (turquoise), the Evangelical Missionary Society Bethel (purple), Evangelical-Lutheran Society from Lipsia (light blue), and the Evangelical Africa-Society (light green). A number of British missionary societies (blue) were also present in the German period. See online version of this article to view figure in color.

Source: Sprigade and Moisel, *Der Grosse Deutsche Kolonialatlas 1920*; Schlunk, *Das Schulwesen in den Deutschen Schutzgebieten*.

I use a geography-based measure that captures the historic exposure of individual's to Christian missionary activity by constructing a variable that counts the number of missions in a twenty-five-kilometer radius around each respondent's location.⁹¹ The process is done in two steps: first, to separate the effects of protestant and catholic missionaries, second, to separate the effects of each individual missionary society active during the German colonial period.

Following the defeat of the German Empire in WWI, around 50 percent of missionary stations were discontinued, as a result either of wartime damages or the expulsion of certain German missionaries. As mentioned, this discontinuity provides an exciting opportunity to test for the relevance of institutional longevity in the transmission of

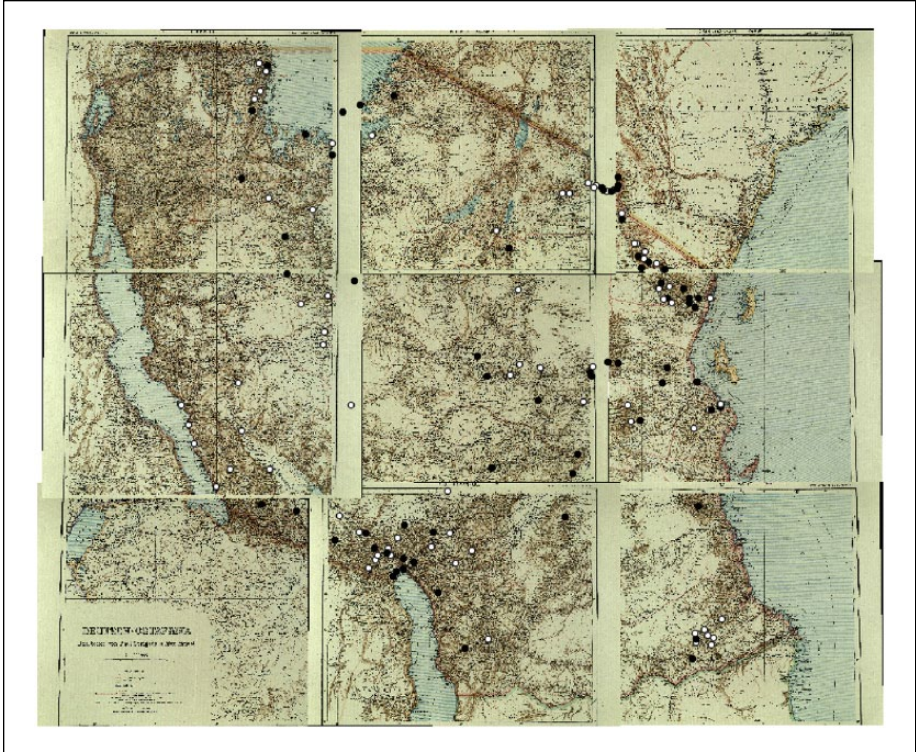


Figure 3. Map Displaying the Locations of Missionary Stations in German East Africa.

Note: Coloring indicates whether a station was in existence in 1924 (white) or discontinued during or after WWI (black). See online version of this article to view figure in color.

Source: Roome, "Ethnographic Survey of Africa."

long-term effects. I use a map created by Roome⁹² to identify the exact location of all Christian missions, not including churches developed by foreigners for their own population, in Africa in 1924 (Figure 3). Contemporary experts in the area have confirmed the accuracy of the mission station locations and the map has been used by several authors.⁹³ Using approximate string matching and careful manual controls, I was able to account for every German precursor to the missionary stations contained in Roome's map. I use this information to separate the effects of missions that existed until the beginning of the war and missions that were continued in the British protectorate.

Intrinsic Concerns with Geospatial Analysis of Historical Effects

Geographical analyses of long-term effects from historical events carry two important caveats that may bias or weaken the results obtained. First, individual characteristics related to the population under study may be related to the likelihood of falling in the

“treatment” group, creating an endogeneity problem. Here I refer to the placement decisions by missionaries in the colonial period. Second, internal mobility in the period between the measurement of the independent variables and the outcome variables could potentially interfere with results.

In order to tackle the endogeneity problem I have followed previous literature, in particular Johnson and Nunn,⁹⁴ which demonstrates that geographic features, such as temperature and altitude, precolonial and colonial population density, and proximity to colonial networks mattered in the placement decisions of colonial missionaries.⁹⁵

Hence, I control for these factors throughout the analysis. However, the most notable interference with “as-if” randomized treatment assignment is the previous presence of the colonial state or factors determining its presence. Missionaries might plausibly have decided to establish stations in direct proximity to administrative stations in order to benefit from access to the colonial network and military protection. Nevertheless, previous analysis based on qualitative and quantitative evidence of the determinants of colonial state presence reveals no systematic relationship between the locations of missionary stations and colonial government.⁹⁶ To ensure that this is upheld in my analysis I have included controls for colonial state presence and violent incidents between the colonial state and the local population, identified as a strong determinant for state presence in previous research.⁹⁷

That colonial agents at the time operated in an environment of very limited information further supports the assertion that their placement decisions were not driven by individual characteristics of the local population with whom they were in direct contact on the ground.⁹⁸ This assertion is supported by qualitative evidence. For example, missionary historian Franz Schäppi writes that broader spatial influence served the purposes of extending the missionaries’ faith to pagan areas and outpacing rivals from other missionary societies and confessions.⁹⁹ This finding is a further argument against an endogeneity problem, as treatment assignment according to specific denomination and characteristics of missionary societies was driven entirely by external factors, not characteristics of the local population. Catholic societies, in particular, had their areas of influence (apostolic vicariates and dioceses) determined by decisions made at the Vatican.¹⁰⁰ Appendix Figure A1 is a map displaying these borders.

A second factor that might interfere with results obtained from this form of geographical analysis is internal mobility in the period between the measurement of the independent variables and the outcome variables. However, internal mobility in Tanzania has been relatively low since independence, predominantly for two reasons. First, Tanzania has enjoyed civil and political stability since independence. The absence of major conflict, in contrast to many other African nations, has virtually prevented internal displacement. Second, Tanzania’s pre-independence social and economic development policy (*Ujaama*, or economic cooperation) entailed a “villagization” of production that severely restricted internal mobility until the late 1980s.¹⁰¹ Thus, although internal mobility certainly existed, it can be assumed that the level was sufficiently low that the effect of the presence of Christian missionaries in the colonial period should still be measurable at the village level. Nevertheless, it

should be noted that results obtained may be diluted and possibly weakened by people's movement since the colonial period.

Control Variables

A host of control variables are included in the analysis to isolate the effect of missionary stations from demographic, geographic, and colonial factors as well as to control for determinants of missionary placement. Demographic controls include the age of respondents and whether they live in an urban or rural environment. I further chose to incorporate a dummy variable for respondents from Zanzibar, as its history and current population structure are quite distinct from mainland Tanzania. The presence of Islam, both in the colonial and in the current era, can be controlled for only with rudimentary precision, as Tanzanian law does not allow surveys to include questions on respondents' religion. However, both colonial sources and the most recent available accounts indicate that Islam is most expressed on Zanzibar and the Tanzanian coastline. Therefore, I have included a dummy variable that takes the value of 1 for respondents living within 250 kilometers of the coast. This variable serves an additional purpose, as the coastal regions of Tanzania had a distinct experience from the rest of the territory due to a stronger overall European presence—limiting our ability to disentangle the effects of colonial administration and missionary stations—and longer and mixed European influences as a result of precolonial European activity. Furthermore, significant economic advantage arose from several harbors that allowed for trade and economic concentration in these areas.

As mentioned, geographic features may be directly related to outcome variables or may have influenced the location decisions of missionaries, thereby creating an endogeneity problem in my analysis. Such features may also affect the structure of the local economy and, as a result, the conceptualization of local gender roles. German missionaries, as well as the German administration, were concerned with their own and their staff's living conditions. A number of studies were undertaken to identify more or less hospitable areas of the colonial territory. Thus, I include variables capturing elevation, precipitation, soil quality, the disease environment, and temperature aggregated at the ward level.

First, I calculated the mean elevation per cell using the Shuttle Radar Topography Mission one-kilometer-resolution data.¹⁰² Second, temperature and precipitation are important factors for agricultural suitability and certainly informed missionary's placement decision. German statistical yearbooks produced by the German Imperial Colonial Office (*Reichskolonialamt*) on a yearly basis from 1892 to 1914¹⁰³ contain substantive statistical annexes, including detailed accounts of several weather stations located across the country. Unfortunately, reliable extrapolation of information across all parts of the colony is not viable, as too few such stations existed. Alternatively, I compared climate information from a total of forty-one stations across the colony with current climate information.¹⁰⁴ I georeferenced the stations and compared temperatures and precipitation with data from the WorldClim project (1960–90)¹⁰⁵ for the exact same locations. The correlations are not perfect—temperatures correlate at 0.91,

precipitation at 0.85—yet, using highly disaggregated current data provides a more accurate representation of spatial climate variations than extrapolations of historical data. I calculate mean annual temperature and mean annual precipitation—based on thirty arc-seconds aggregated at the ward level.

Third, detailed maps on the presence of the tsetse fly allow me to determine each cell's local disease burden, measured as a simple count of locations exhibiting tsetse fly populations within a cell. I further employ a measure for potential agricultural production in the territory both during the colonial period and today.¹⁰⁶ I rely on a general indicator of soil suitability for agriculture from the *Harmonized World Soil Database*.¹⁰⁷ All geographic controls listed above are aggregated at the ward level, to adequately reflect the environment in the proximity of all observations.

Next, I created a set of variables controlling for the integration of missionaries into the colonial network, and the effect of other colonial policies. The missionary stations' approach to the local population was highly dependent on their denomination and individual missionaries. Specifically, some missionaries put a much stronger emphasis on conversion than others, restricting the access of non-Christians to their educational institutions. In order to add further nuance to my analysis, I used demographic information about the student population at each missionary station to construct a variable capturing the share of Christians. Three missionary societies from Britain and the United States were active in the territory of German East Africa at the time of study. Although the number of stations they operated was relatively small, I included a dummy variable to control for the national origins of each missionary station.

Missionaries, as mentioned, were motivated by the ambition to add as many people to their flocks as possible, to validate their national and religious objectives, and to outpace their rivals from other confessions. Hence, I use georeferenced colonial estimates of overall population density to construct an ordinal indicator of population density at the lowest cell level possible.¹⁰⁸ This serves the additional purpose of controlling for indigenous factors, as higher population density at the start of the colonial period might have been associated with different forms of precolonial rule and corresponding potential for economic development.¹⁰⁹

A relevant factor for the placement decision of missionaries was proximity to the colonial network. Hence, I georeferenced the location of every colonial administrative and military station active in the colonial period and applied an analogous measure as in the independent variables to control for their presence. Nevertheless, the presence of colonial infrastructure is measured within a radius of fifty kilometers, as their staff was active in a much larger radius than missionaries. In addition, this measure accounts for the general effects of the colonial state and allows me to separate the direct influence of missionaries from the overall implications of colonial policies. I further controlled for colonial violence that may have had serious repercussion for the interaction between local populations and their colonizers. To this end, I constructed a variable that measures the number of conflicts that occurred in direct proximity to (within fifty kilometers of) individual villages. I compounded this information using a 1911 account, by a former major in the German colonial force, containing detailed information about the establishment of German stations and about violent encounters of the military and the population.¹¹⁰

Empirical Results I

In this section I analyse the effect of Christian missionaries on current education outcomes in Tanzania. I will test whether the historical treatment contributed to current gender gaps in these outcomes, in order to identify a relationship between colonial education and current gender inequalities in Tanzania. I begin by confirming the long-term effects of colonial missionaries on education outcomes, followed by an examination of differential effects on men and women in both absolute and relative terms. I will gradually introduce more nuance into the estimations, so as to isolate the drivers of the observed effects.

The analytical approach is adapted from previous research by Nunn,¹¹¹ who uses similar approach to identify gender differences in the long-term effects of missionary education. However, I deliberately avoid using an ethnicity-based model, as the ethnic data, in particular for the precolonial period, are extremely unreliable as they are based on the first observation by Europeans and fail adequately to reflect the fluidity of ethnic boundaries. Furthermore, my dataset contains a considerably larger number of observations, being based on the DHS survey rather than Afrobarometer, and a superior degree of nuance in the colonial data. This allows me to add further detail to the nature of the “treatment” and to control for a range of other factors.

Outcome 1: Years of Education

I begin by examining whether exposure to Christian missionaries affects educational outcomes today. I test for a relationship between the intensity of a *village's* historic exposure to missionaries during the colonial period and an individual's years of education. First, I estimate the average effect of Christian missionaries on individual's years of education with the following equation:

$$Y_i = a_{y,r} + x_{i,c,g}\beta + mint_v * \gamma,$$

where i indexes individuals nested in villages. The dependent variable measures individual i 's educational attainment (in years). The vector $x_{i,c,g}$ includes a host of control variables that are measured at the individual, missionary station, village, and ward level. Individual-level control variables include a gender indicator variable, the respondent's age, an indicator variable that equals 1 if the respondent is living in a rural location, and an indicator variable that equals 1 if the respondent is living within 250 kilometers of the coastline. Colonial control variables include the proportion of Christian students at the closest missionary station, an indicator variable that takes the value of 1 if the missionary station was of British origin, the population density in the colonial period, an indicator variable that takes the value 1 if a colonial administrative or military station was within a fifty-kilometer radius of the geographic location of the respondent, and the number of violent clashes between local population and colonial forces in a fifty-kilometer radius of the respondent. Geographic controls include mean annual precipitation, mean annual temperature, mean soil quality, mean elevation, and the local disease environment. The variable $mint_v$ captures individual's historic

Table 1. Impact of Missionary Stations on Current Years of Education (OLS) (Dependent Variable: Years of Education).

	(1)	(2)	(3)	(4)
Missionary Stations	0.410*** (0.0659)	0.399*** (0.0694)		
Missionary Stations × Female		0.0187 (0.0346)		
Catholic Missionaries			0.360*** (0.0875)	0.419*** (0.0912)
Catholic Missionaries × Female				-0.0952* (0.0472)
Protestant Missionaries			0.198** (0.0695)	0.134+ (0.0739)
Protestant Missionaries × Female				0.104* (0.0450)
Female	-0.836*** (0.0362)	-0.849*** (0.0431)	-0.838*** (0.0361)	-0.842*** (0.0416)
Individual Controls	Yes	Yes	Yes	Yes
Mission-Level Controls	Yes	Yes	Yes	Yes
Colonial Controls	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes
Observations	42898	42898	42898	42898
Adjusted R ²	0.166	0.166	0.165	0.165
F	70.46	69.04	68.66	65.99

Note: Standard errors in parentheses.

*p < 0.10, *p < 0.05, **p < 0.01, ***p < 0.001.

Sources: Author's construction based on Schlunk, *Das Schulwesen in den Deutschen Schutzgebieten*; Sprigade and Moisel, *Der Große Deutsche Kolonialatlas 1920*; Nigmann, *Geschichte der Kaiserlichen Schutztruppe für Deutsch-Ostafrika*; Hijmans et al., "Very High Resolution Interpolated Climate Surfaces for Global Land Areas"; National Bureau of Statistics, *Tanzania HIV/AIDS and Malaria Indicator Survey 2007–08*; National Bureau of Statistics, *Tanzania Demographic and Health Survey 2010*; National Bureau of Statistics, *Tanzania HIV/AIDS and Malaria Indicator Survey 2011–12*.

exposure to missionary activity measured by the number of missions (Catholic and Protestant) in the village of the respondent. More precisely, the measure is calculated by identifying the number of missions within a twenty-five-kilometer radius of the geographic location of the respondent. $\alpha_{y,r}$ denotes region and DHS-year fixed effects. Standard errors are clustered at the village level in order to avoid heteroskedasticity.

OLS estimates of Equation 1 are reported in Table 1. All regressions include individual-level, mission, and geographic controls. Column 1 reports estimates with the village-level variable capturing the number of missions in the respondent's direct proximity. Generally, The results show that the effect is both positive and statistically significant, indicating that individuals living in villages with a higher exposure to missionary stations during the colonial period have completed more years of education

than the rest of the population. This confirms previous studies that have demonstrated a positive relationship between colonial education and current levels of education at a regionally disaggregated level. It demonstrates that missionary activity, in particular education, has had a lasting impact on those locations directly affected by it. Furthermore, while spillover effects to other areas are highly likely, it indicates that the effects are most pronounced in areas directly exposed to the “treatment.”

Next, I test the central hypothesis whether the long-term implications of colonial education for men and women differ and potentially contributed to current gender inequalities in Tanzania. In order to do this, I modify the equation to allow for the effect of missions on current education to differ depending on respondent’s gender by interacting the main independent variables with the gender indicator variable. The results are presented in Column 2 of Table 1. The interaction term between village-level missionary activity and female respondents is small and statistically insignificant, providing no indication of a variable effect on current differences in education levels between men and women. Thus, the initial analysis does not support the hypothesis that Christian missionaries made a direct contribution to Gender inequality.

However, as previous studies have shown,¹¹² differences between Catholic and Protestant missionaries with regard to their teachings, approach, and style of education may have affected the exposed local population in a different manner. Thus, following the example given in previous studies, I separate the missions by denomination in order to allow for a higher degree of differential effect. Adopting a similar approach as in the previous estimation, the equation for this model is given by

$$Y_i = a_{y,r} + x_{i,c,g}\beta + mprot_v * \gamma + mcat_v * \theta,$$

where i continues to index individuals nested in villages. The dependent variable gain measures individual i ’s educational attainment in years of schooling. The vector $x_{i,c,g}$ includes the same host of control variables that are measured at the individual, missionary station, village, and ward level. The variables $mprot_v$ and $mcat_v$ follow the same logic as the dependent variable in the previous equation, but rather than measuring the overall intensity of missionary activity in the proximity of an individual’s village, it measures the intensity of the villages historic exposure to Protestant and Catholic missionaries. As in the previous estimation, $a_{y,r}$ denotes region and DHS-year fixed effects and the standard errors are clustered at the village level in order to avoid heteroskedasticity.

The estimates are reported in Column 3 of Table 1 and show a positive and statistically significant effect of both catholic and protestant missionaries on average years of education. Interestingly, the effect of catholic missionaries on average years of education appears to be stronger than that of Protestant missionaries. Generally, these findings provide added evidence to the hypothesis that differences between Catholic and Protestant missionaries are of relevance to their long-term effect on human capital development, in particular with regards to differences between men and women.

These differences are of considerable relevance to the central hypothesis, which becomes evident after an interaction term between the explanatory variables is

included. The results of this regression are presented in Column 4 of Table 1. The positive effect of Protestant missionaries on years of education seems to be shared almost equally between men and women, whereas the effect of Catholic missionaries appears more positive for men than for women. Nevertheless, the coefficient of the interaction term is relatively small and a net increase in years of education for both men and women can be observed. Thus, after separating the effect of protestant and catholic missionaries, this finding documents the existence of a variable impact of Christian missions on current education levels of men and women.

This section established the long-term effect of missionary activity on current education outcomes, a variable effect of missionaries from different denominations, and a contribution of missionaries, at least Catholic missionaries, to current socioeconomic gender inequalities in Tanzania. The next section will reiterate the analytical process with a different outcome variable, literacy, in order to provide additional evidence for the previously identified relationship.

Outcome 2: Literacy

Literacy levels, as mentioned before, can be considered a more apt measure to capture effective education and underlying societal preferences for the education of different social groups. In this analysis, I maintain the explanatory and control variables used in the previous section, but instead rely on logistic regression for a binary variable, indicating whether a survey respondent is literate or not.

The effects of missionary education in general are presented in Columns 1 and 2 of Table 2. Direction and statistical significance of the coefficients in both models confirms and simultaneously complements the previous findings, by demonstrating that an individual's historic exposure to Christian missionaries in the colonial period raises their predicted probability of being literate, irrespective of their gender.

Separating the effects of Protestant and Catholic missionaries changes the results drastically, as in the previous example. The estimates of this analysis can be found in Columns 3 and 4 of Table 3. While both Protestant and Catholic missionaries appear to have contributed to a higher level of literacy among the affected population, the difference in the size of their effect appears to have shrunk. Nevertheless, the introduction of interaction terms indicates that Catholic missionaries have contributed profoundly to raising men's literacy compared to women's, whereas the effect of Protestants remains statistically indistinguishable (see Figure 4). This result confirms and exacerbates the previous finding. The long-run effect of colonial missionaries of different denominations on overall human capital formation is positive and comparable. However, the effect of Protestant missionaries is shared almost equally by men and women, possibly even reducing the gender gap in educational outcomes. The long-term effect of Catholic missionaries, on the other hand, appears to have been driven predominantly by advances in male education. Catholic missionaries appear to have contributed to the formation of gender gaps and, by extension, to potentially increased levels of socioeconomic gender inequality in current Tanzania.

Table 2. Impact of Missionary Stations on Current Probability of Literacy (Logit).

	(1)	(2)	(3)	(4)
Missionary Stations	0.264** (0.0804)	0.363** (0.111)		
Missionary Stations × Female		-0.116 (0.0801)		
Catholic Missions			0.215+ (0.120)	0.578** (0.193)
Catholic Missions × Female				-0.420** (0.140)
Protestant Missions			0.182* (0.0919)	0.0814 (0.122)
Protestant Missions × Female				0.120 (0.0948)
Female	-0.633*** (0.0659)	-0.580*** (0.0739)	-0.634*** (0.0658)	-0.558*** (0.0730)
Individual Controls	Yes	Yes	Yes	Yes
Mission-Level Controls	Yes	Yes	Yes	Yes
Colonial Controls	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes
Observations	10759	10759	10759	10759
Log-Likelihood	-5490.0	-5488.9	-5494.0	-5487.2
Akaike Information Criterion	11062.0	11061.8	11072.0	11062.5

Note: Standard errors in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, **** $p < 0.001$.

Source: Author's construction based on Schlunk, *Das Schulwesen in den Deutschen Schutzgebieten*; Sprigade and Moisel, *Der Große Deutsche Kolonialatlas 1920*; Nigmann, *Geschichte der Kaiserlichen Schutztruppe für Deutsch-Ostafrika*; Hijmans et al., "Very High Resolution Interpolated Climate Surfaces for Global Land Areas"; National Bureau of Statistics, *Tanzania HIV/AIDS and Malaria Indicator Survey 2007–08*; National Bureau of Statistics, *Tanzania Demographic and Health Survey 2010*; National Bureau of Statistics, *Tanzania HIV/AIDS and Malaria Indicator Survey 2011–12*.

Interpretation of Results

The analysis establishes an overall positive long-term effect of missionary education on current education outcomes in Tanzania, as the average level of education and literacy is higher in areas proximate to the historic location of colonial missionaries. Furthermore, Catholic missionaries appear to have had a stronger positive effect on average education and literacy rates than their Protestant counterparts. This contradicts previous findings, such as those of Gallego and Woodberry,¹¹³ who found that Protestant missionaries had a larger positive impact on long-term education than Catholic missionaries. Furthermore, the relatively weaker effect of Protestantism on education raises doubts about the claim that Protestantism contributed to higher levels of economic prosperity or democracy via human capital formation.¹¹⁴

Table 3. Relevance of Discontinued Missionary Stations for Literacy Effect (Logit).

	(1)	(2)	(3)	(4)
Missionary Stations 1914	0.0917 (0.0824)	0.232 ⁺ (0.135)		
Missionary Stations 1914 × Female		-0.162 (0.120)		
Missionary Stations 1924	0.236 ^{**} (0.0834)	0.313 [*] (0.144)		
Missionary Stations 1924 × Female		-0.0873 (0.127)		
Catholic Missions 1914			0.0922 (0.125)	0.419 [*] (0.190)
Catholic Missions 1914 × Female				-0.376 [*] (0.162)
Catholic Missions 1924			0.369 [*] (0.170)	0.757 [*] (0.330)
Catholic Missions 1924 × Female				-0.448 ⁺ (0.256)
Protestant Missions 1914			0.137 (0.119)	0.0622 (0.215)
Protestant Missions 1914 × Female				0.0884 (0.194)
Protestant Missions 1924			0.161 ⁺ (0.0909)	0.116 (0.144)
Protestant Missions 1924 × Female				0.0538 (0.138)
Female	-0.635 ^{***} (0.0656)	-0.569 ^{***} (0.0731)	-0.635 ^{***} (0.0657)	-0.552 ^{***} (0.0736)
Individual Controls	Yes	Yes	Yes	Yes
Mission-Level Controls	Yes	Yes	Yes	Yes
Colonial Controls	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes
Observations	10759	10759	10759	10759
Log-Likelihood	-5493.1	-5491.0	-5491.3	-5485.1
Akaike Information Criterion	11070.2	11069.9	11070.7	11066.2

Note: Standard errors in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, **** $p < 0.001$.

Source: Author's construction based on Schlunk, *Das Schulwesen in den Deutschen Schutzgebieten*; Sprigade and Moisel, *Der Große Deutsche Kolonialatlas 1920*; Nigmann, *Geschichte der Kaiserlichen Schutztruppe für Deutsch-Ostafrika*; Hijmans et al., "Very High Resolution Interpolated Climate Surfaces for Global Land Areas"; National Bureau of Statistics, *Tanzania HIV/AIDS and Malaria Indicator Survey 2007–08*; National Bureau of Statistics, *Tanzania Demographic and Health Survey 2010*; National Bureau of Statistics, *Tanzania HIV/AIDS and Malaria Indicator Survey 2011–12*; Roome, "Ethnographic Survey of Africa."

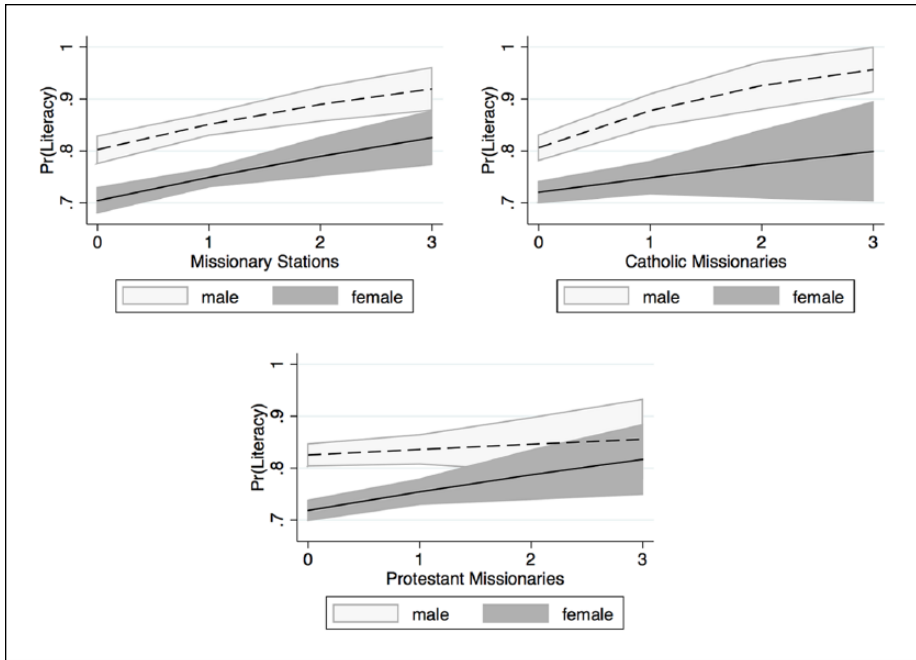


Figure 4. Predicted Probability of Literacy depending on Exposure to Missionary Stations.
Source: Author's construction based on Table 2.

Allowing for variation in the explanatory variable—namely, separating the effects of Protestant and Catholic missionaries—demonstrates the diversity of this relationship with regard to gender differences. The results suggest that Catholic missionaries, while making a positive contribution to the current level of education, contributed markedly to the existence of a gender gap in education in current Tanzania, thereby exacerbating gender inequality on the socioeconomic dimension. This effect is more pronounced in literacy, which, as has been argued, is a better indicator of effective education, in particular in the context of Tanzania.¹¹⁵

Two key questions arise from these results. First, why did Catholic missionaries contribute more than their Protestant counterparts to increasing the gender gap in education outcomes? Second, what were the drivers of these effects? More specifically, what explains their persistence over time? Are they actually related to the historic influence of the German colonial period? Although the overarching ambition of (German) missionaries fundamentally to transform indigenous societies has been documented in previous sections, these question are essential to delineating the relevance of the relationship between the historical events and the outcomes under study. The next section hypothesizes and tests possible avenues for the persistence of the effect of German colonial missionaries on the current nature of gender inequality in Tanzania.

Explaining Observed Effects: Longevity of Exposure

The German colonial period ended with the German defeat in World War I in 1918, yet significant parts of the territory, in particular the coastal regions, were engulfed in war from 1914 onward. At the end of the war, seventy-four missionary stations out of 142 (52 percent) were destroyed, abandoned, or closed by the new British administration. Catholics and Protestants were affected alike, with the former losing thirty-six out of sixty-four (56 percent) and the latter thirty out of seventy-six (40 percent). In the early stages of the British Protectorate of Tanzania no new missionary stations were formed, although additional missionary stations were formed during later stages of the British protectorate in Tanzania, which also formed a backbone in the contemporary colonial education system. However, the stations that continued underwent considerable change, as a result both of new regulations regarding educational policy and cultural education during the British Protectorate and changing cultural and societal conventions in Europe. Therefore, it is vital to test whether the observed effects of missionary activity on education and gender inequality are carried by stations active during the German period, the British period, or both. The historical discontinuity inherent to this case is unique in the history of colonization on the African continent and thus provides an interesting opportunity to test how impactful were the colonial missionaries' ambitions for cultural transformation.

Empirical Results II

Information available in Roome's map allows me to separate missionary stations active until 1914 from those that were maintained during the British Protectorate.¹¹⁶ I use a model similar to that in the previous analysis, but the independent variables have been transformed into two separate variables that capture the number of missionary stations active either until 1914 or beyond. This procedure was repeated for Catholic and Protestant missions. Considering that the results were most pronounced for literacy, I restrict the analysis to this outcome. The model uses the same control variables as before. As in previous estimations, region and DHS-year fixed effects are included and the standard errors are clustered at the village level in order to avoid heteroskedasticity. The results of this analysis, presented in Column 1–2 of Table 3, indicate that missionary stations active only during the German period do not appear to have had an effect on current education outcomes. Although the results are slightly altered by an inclusion of an interaction term between missionary intensity and the gender indicator, with the main effect of these missions becoming significant at the 10 percent level, their overall impact on the both current education outcomes and the gender gap is statistically negligible. By contrast, missions that were maintained during the British Protectorate—thereby also having a significantly different setup and context from missions only active in the German period—appear to be the main driver of the effect previously observed.

Separating the influence of Catholic and Protestant missionaries (Columns 3–4), once again, significantly alters the results. Whereas the results resemble those from the first model, the inclusion of an interaction between variable capturing the number of missionary stations in the proximity of an individual's village and the gender variable produces results that support the hypothesis that at least some German missionary stations influenced current education outcomes and contributed to the nature of gender inequality in Tanzania. Although the effect of Protestants on literacy is small and negligible, Catholic missionaries appear to have contributed to an increased level of literacy in their direct proximity with a strong gender bias today. This is particularly evident for German Catholic missionaries, for which the interaction term for females almost entirely negates the positive effect on literacy for men. The effect size of maintained Catholic missions appears to be higher on men, whereas the effect on women does not differ as much and is significant only at the 10 percent level. This can be viewed as an indication both of the increased effectiveness of missionary schools that lasted longer and of more progressive attitudes toward gender rules during the middle stages of the twentieth century.

These results confirm the hypothesis that the initial period of colonization left a noticeable impact on the cultural and societal fabric of Tanzania today. It highlights that Protestant and Catholic missionaries, though both contributing to human capital development, influenced gender-related norms, at least pertaining to education, in a different manner. Of course, this does not explain the current nature of gender inequality in Tanzania, but it demonstrates that the colonial experience played a part in shaping them, even a century after its termination.

Having established that Catholic missionaries during the colonial period had a significant impact on current educational outcomes and contributed to gender inequality in Tanzania, I now return to the question regarding the differential impact of Catholics and Protestants, or, more specifically, what differences exist between Catholic missionaries and Protestant missionaries that can explain observed variation in long-term effects on gender gaps in education. The next section will go into more detail about potential drivers behind the relationship between missionaries and gender-biased education outcomes.

Further Investigation of Missionary Societies' Heterogeneous Effects

Previous sections have established that notable differences exist between the Catholic and Protestant approach to preexisting gender roles and attempts at cultural penetration. However, those findings do not preclude the possibility that differences within denominations did not matter. Although denominations certainly overlap considerably in their worldviews, their structural approaches toward implementing and imposing their worldviews on the local population differed at times. Therefore, I have separated the effects of each individual missionary society in order to discern whether individual

drivers of the effects can be identified and related to idiosyncratic features of missionary stations and schools.

Empirical Results III

I adapt the model used in previous analyses to allow for a higher degree of disaggregation by transforming the explanatory variable(s). Considering that the results were most pronounced for literacy, I restrict the analysis to this outcome. Furthermore, the independent variables are transformed into binary indicators of the historic missionary presence of each missionary society. I have chosen to conduct this analysis with a binary explanatory variable instead of the previously applied intensity measure, in order to reduce the added complexity stemming from including additional variables measuring the effect of individual missionary societies.

The results of a logistic regression of different missionary societies on the predicted probability of literacy show no statistically significant effects across the board (see Table 4). However, introducing an interaction term between each missionary society and the female variable significantly alters the results, in terms both of strength and statistical significance. Of particular interest in this case are the Holy Ghost Fathers and the White Fathers, who appear to be the only missionary societies with a statistically discernible effect on literacy. For both societies, both the main effect and the interaction terms are significant at the 5 percent level and point to a strongly diverse effect on the dependent variable. This result indicates that the previously observed effects of Catholic missionaries on the gender gap in literacy are predominantly driven by the effect of missionary stations' belonging to either of the two societies. The only other Catholic missionary society active in the same period, with a similar number of stations and personnel, the Benedictines from St. Ottilien, did not produce a similar effect on the observed outcomes. Three major differences in the structural conditions at missionary schools from different Catholic missionary societies can be observed that may explain the variation in the results.

First, Holy Ghost Fathers and the Benedictines from St. Ottilien relied on a schooling approach aimed at spatial expansion of education, the establishment of vast numbers of village schools (so-called *Buschschulen*) in proximate regions.¹¹⁷ The strategy can be explained by the relatively strong presence of Islam in the coastal regions, where both missionary societies were concentrated, and their ambition to halt its spread through mass conversion.¹¹⁸ The White Fathers, on the other hand, relied on targeted education and conversion of local elites, predominantly the sons of village chiefs in surrounding areas.¹¹⁹ In turn, they hoped to sway public opinion in their favor, thereby attracting the local population to their more centralized missionary schools. Nevertheless, as both the Holy Ghost Fathers and the White Fathers, using different strategies, are drivers of the observed effects, it appears implausible that those difference strategies explain the difference in results. This further indicates that the influence of Islam on the ultimate effectiveness of Christian missionaries appears to have been relatively limited.

Table 4. Missionary Societies and Literacy (Logit).

	(1)	(2)
Holy Ghost Fathers (C)	0.287 (0.268)	0.913* (0.394)
Holy Ghost Fathers (C) × Female		−0.736* (0.338)
White Fathers (C)	0.265 (0.250)	0.808 (0.356)
White Fathers (C) × Female		−0.629* (0.260)
St. Ottilien (C)	0.378+ (0.199)	0.518+ (0.290)
St. Ottilien (C) × Female		−0.157 (0.256)
Berlin (P)	0.189 (0.263)	0.254 (0.418)
Berlin (P) × Female		−0.501 (0.638)
Bethel (P)	0.454 (0.369)	0.778 (0.638)
Bethel (P) × Female		−0.341 (0.552)
Herrnhut (P)	0.612 (0.374)	1.047* (0.441)
Herrnhut (P) × Female		−0.511+ (0.277)
Lipsia (P)	0.792 (0.483)	0.193 (0.574)
Lipsia (P) × Female		0.721* (0.353)
Generalkonferenz (P)	0.258 0.213	0.187 (0.567)
Generalkonferenz (P) × Female		0.0946 (0.531)
British Missions (P)	0.439 (0.435)	0.0361 (0.502)
British Missions (P) × Female		0.439 (0.287)
Female	−0.631*** (0.0657)	−0.533*** (0.0760)
Individual Controls	Yes	Yes
Mission-Level Controls	Yes	Yes
Geographic Controls	Yes	Yes
Observations	10759	10759
Log-Likelihood	−5483.9	−5473.3
Akaike Information Criterion	11065.8	11062.6

Note: Standard errors in parentheses.

+p < 0.10, *p < 0.05, **p < 0.01, ***p < 0.001.

Source: Author's construction based on Schlunk, *Das Schulwesen in den Deutschen Schutzgebieten*; Sprigade and Moisel, *Der Große Deutsche Kolonialatlas 1920*; Nigmann, *Geschichte der Kaiserlichen Schutztruppe für Deutsch-Ostafrika*; Hijmans et al., "Very High Resolution Interpolated Climate Surfaces for Global Land Areas"; National Bureau of Statistics, *Tanzania HIV/AIDS and Malaria Indicator Survey 2007–08*; National Bureau of Statistics, *Tanzania Demographic and Health Survey 2010*; National Bureau of Statistics, *Tanzania HIV/AIDS and Malaria Indicator Survey 2011–12*; Roome, "Ethnographic Survey of Africa."

A second discernible difference is the emphasis attached to the creation of “Christian settlements” in proximity to missionary stations as a catalyst for conversion. In those settlements, the missionaries were able to exercise considerable influence over the everyday life of the population and to impose their values and inherently valued cultural traditions. This can be observed in the strategy of the Holy Ghost Fathers and the Benedictines of St. Ottilien.¹²⁰ However, the emphasis on Christian settlement does not explain the observed difference in effect: the Holy Ghost Fathers’ long-term effects on the current gender gap in literacy are visible, while those of the Benedictines from St. Ottilien are not. Furthermore, the White Fathers, who did not use this approach, were identified as one of the two major drivers of the observed effects.

Finally, a considerable difference in the structural conditions can be observed in the experience of missionary societies during both the intensive phase of German colonization and World War I. The Benedictines of St. Ottilien, unlike the White Fathers and the Holy Ghost Fathers, were dealt a massive setback by the Maji-Maji uprising in 1904–5. Several stations and schools were destroyed, and the uprising inhibited them from effectively reaching the population for at least a year. The Benedictines from St. Ottilien were affected to a considerably higher degree by destruction and violence during World War I, losing almost all of their stations.¹²¹ By contrast, the White Fathers did not lose a single missionary station and the Holy Ghost Fathers lost around half their stations.¹²² Neither saw their practice heavily interrupted during the German colonial or the WWI period. As we have seen, maintaining missionary stations after the end of German East Africa did not matter to the relationship between the historic effect of missionaries on education and gender inequality. When several alternatives that could explain the differential effects of Catholic missionary societies are ruled out, it appears plausible to assume that external obstruction during the colonial period explains the differential impacts between Catholic missionary societies. Furthermore, this finding is evidence for the hypothesis that Catholic missionary societies in German East Africa, when able to perform their work effectively, left a legacy of gender inequality in Tanzania. This finding is robust even for missionary stations that were discontinued a century ago, as local cultures were infused Western norms, in particular with regard to gender roles, that persisted over time.

Discussion and Conclusion

This study confirms previously identified positive long-term effects of missionary societies on educational outcomes, including through the of intergenerational transmission of knowledge and norms.¹²³ However, it provides only limited evidence to support the hypothesis that Protestant missionaries had a comparatively benign effect on women’s empowerment and gender equality.¹²⁴ Catholic missionary societies in German East Africa, although they had a positive effect on educational outcomes in

general, appear to have had a markedly negative effect on the gender gap in education and literacy. This indicates an exacerbation of gender inequality on the socioeconomic dimension and impairs women's empowerment. Furthermore, the findings cast doubt on the argument that Protestantism and Protestant missionaries are linked to economic prosperity and democracy via catalytic effects on long-run human capital formation.

Nevertheless, this study does not provide a full picture of missionary societies' impact on human capital, development, cultural factors, or gender inequality in Tanzania or in Africa. For example, available data and historic evidence do not permit analysis that reveals whether gender inequalities were created or merely exacerbated by the work of missionary societies.¹²⁵ As shown by Alesina, Giuliano and Nunn,¹²⁶ the origin of gender roles possibly date back to the early adoption of agricultural practices. Yet the observed results do provide strong confirmation of the hypothesis that missionary societies contributed to the formation of the gender roles and gender inequality witnessed today. Furthermore, it is impossible fully to rule out the effect of religion as a driver and carrier of gender biases in educational outcomes, as the government of Tanzania prohibits religious surveys. This applies equally to the influence of Islam, both in the colonial and precolonial period. Nevertheless, the stronger effect of missionary societies active only during the German colonial era on the gender gap in educational outcomes indicates that the observed effects are carried by factors other than simply the Catholic faith. Finally, the findings are produced in the context of a relatively understudied case of colonialism with a number of unique features. Nevertheless, the strategies adopted by the German colonial regime and its agents mirror those of other colonial regimes in the phase of "high imperialism" following the Berlin Conference in 1884.¹²⁷ Furthermore, gender-specific aspects intrinsic to the work of missionary societies reflected, not German, but European values at the time. Hence, the findings of this study are comparable not just to other German colonies, but also to the work of other missionary societies and African colonies during this particular phase of the colonial period.

In spite of these drawbacks, this study provides a valuable impetus to reconceptualize the notion of the comparatively "benign" effects of missionary societies in colonial Africa. In particular, it provides evidence that it is vital to understand colonial actors not just as providers of education but also as incubators of contemporary Western culture. Furthermore, the findings directly relate to policy formulation aimed at alleviating gender inequality in Africa. After all, "[a] realistic understanding of the role of historical factors is essential for policy assessment. One could obtain misleading conclusions about the effects of specific policies and institutions when not taking into account the role of long-term variables."¹²⁸ Hence, an effective policy strategy on gender equality and women's empowerment should to reflect the contributions of missionary societies to the wider socioeconomic and political context of gender inequality in Tanzania and Africa.

Appendix

Table A1. Summary Statistics.

Statistic	N	Mean	St. Dev.	Min	Max
mission 25intcap	47,233	0.627	1.007	0	3
mission cat25intcap	47,233	0.397	0.838	0	3
mission prot25intcap	47,233	0.392	0.825	0	3
mission 25intcap 1914	47,233	0.392	0.847	0	3
mission 25intcap 1924	47,233	0.408	0.783	0	3
mission cat25intcap 1914	47,233	0.248	0.624	0	3
mission cat25intcap 1924	47,233	0.149	0.385	0	2
mission prot25intcap 1914	47,233	0.151	0.419	0	3
mission prot25intcap 1924	47,233	0.262	0.649	0	3
education years	48,302	6.222	3.640	0	21
literate2	12,457	0.752	0.432	0	1
female	48,303	0.630	0.483	0	1
zanz	46,369	0.110	0.313	0	1
mission br25	47,233	0.026	0.160	0	1
christshare25	47,233	0.113	0.237	0.000	1.000
Rur	47,233	0.766	0.424	0	1
age	48,303	28.533	9.804	15	49
precipitation	42,899	9.184	2.578	4.094	19.898
ln soil quality	46,369	1.715	0.351	-4.605	1.947
ln elevation	42,899	6.173	1.546	2.001	7.985
temp mean	42,899	22.755	2.830	10.674	27.741
col popdensity	46,369	1.879	0.610	1.000	4.000
disease count	46,369	0.555	2.246	0	41
station50	47,233	0.446	0.497	0	1
ln battle 50int	47,233	-2.046	2.728	-4.605	2.198
coast250	47,233	0.428	0.495	0	1
round	48,303	4.062	0.857	3	5

Source: Authors' data.

Table A2. Replication of Table I Highlighting Effect of Administrative Stations on Dependent Variable.

	(1)	(2)	(3)	(4)
Missionary Stations	0.410*** (0.0659)	0.399*** (0.0694)		
Missionary Stations × Female		0.0187 (0.0346)		
Catholic Missionaries			0.360*** (0.0875)	0.419*** (0.0912)

(continued)

Table A2. (continued)

	(1)	(2)	(3)	(4)
Catholic Missionaries × Female				−0.0952* (0.0472)
Protestant Missionaries			0.198** (0.0695)	0.134+ (0.0739)
Protestant Missionaries × Female				0.104* (0.0450)
Female	−0.836*** (0.0362)	−0.849*** (0.0431)	−0.838*** (0.0361)	−0.842*** (0.0416)
Administrative Station	0.157 (0.0998)	0.157 (0.0998)	0.190 (0.0999)	0.189 (0.0999)
Individual Controls	Yes	Yes	Yes	Yes
Mission-Level Controls	Yes	Yes	Yes	Yes
Colonial Controls	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes
Observations	42898	42898	42898	42898
Adjusted R ²	0.166	0.166	0.165	0.165
F	70.46	69.04	68.66	65.99

Note: Standard errors in parentheses.

*p < 0.10, **p < 0.05, ***p < 0.01, ****p < 0.001.

Sources: Author's construction based on Schlunk, *Das Schulwesen in den Deutschen Schutzgebieten*; Sprigade and Moisel, *Der Große Deutsche Kolonialatlas 1920*; Nigmann, *Geschichte der Kaiserlichen Schutztruppe für Deutsch-Ostafrika*; Hijmans et al., "Very High Resolution Interpolated Climate Surfaces for Global Land Areas"; National Bureau of Statistics, *Tanzania HIV/AIDS and Malaria Indicator Survey 2007–08*; National Bureau of Statistics, *Tanzania Demographic and Health Survey 2010*; National Bureau of Statistics, *Tanzania HIV/AIDS and Malaria Indicator Survey 2011–12*; Roome, "Ethnographic Survey of Africa."

Table A3. Replication of Table I without Administrative Stations as Control Variable.

	(1)	(2)	(3)	(4)
Missionary Stations	0.423*** (0.0658)	0.411*** (0.0693)		
Missionary Stations × Female		0.0190 (0.0347)		
Catholic Missionaries			0.362*** (0.0877)	0.422*** (0.0914)
Catholic Missionaries × Female				−0.0959 (0.0473)*
Protestant Missionaries			0.214** (0.0698)	0.149* (0.0743)
Protestant Missionaries × Female				0.105* (0.0450)
Female	−0.837*** (0.0353)	−0.849*** (0.0430)	−0.838*** (0.0353)	−0.842*** (0.0412)

(continued)

Table A3. (continued)

	(1)	(2)	(3)	(4)
Individual Controls	Yes	Yes	Yes	Yes
Mission-level Controls	Yes	Yes	Yes	Yes
Colonial Controls	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes
Observations	42898	42898	42898	42898
Adjusted R ²	0.166	0.166	0.165	0.165
F	72.27	70.81	70.43	67.65

Note: Standard errors in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, **** $p < 0.001$.

Source: Author's construction based on Schlunk, *Das Schulwesen in den Deutschen Schutzgebieten*; Sprigade and Moisel, *Der Große Deutsche Kolonialatlas 1920*; Nigmann, *Geschichte der Kaiserlichen Schutztruppe für Deutsch-Ostafrika*; Hijmans et al., "Very High Resolution Interpolated Climate Surfaces for Global Land Areas"; National Bureau of Statistics, *Tanzania HIV/AIDS and Malaria Indicator Survey 2007–08*; National Bureau of Statistics, *Tanzania Demographic and Health Survey 2010*; National Bureau of Statistics, *Tanzania HIV/AIDS and Malaria Indicator Survey 2011–12*.

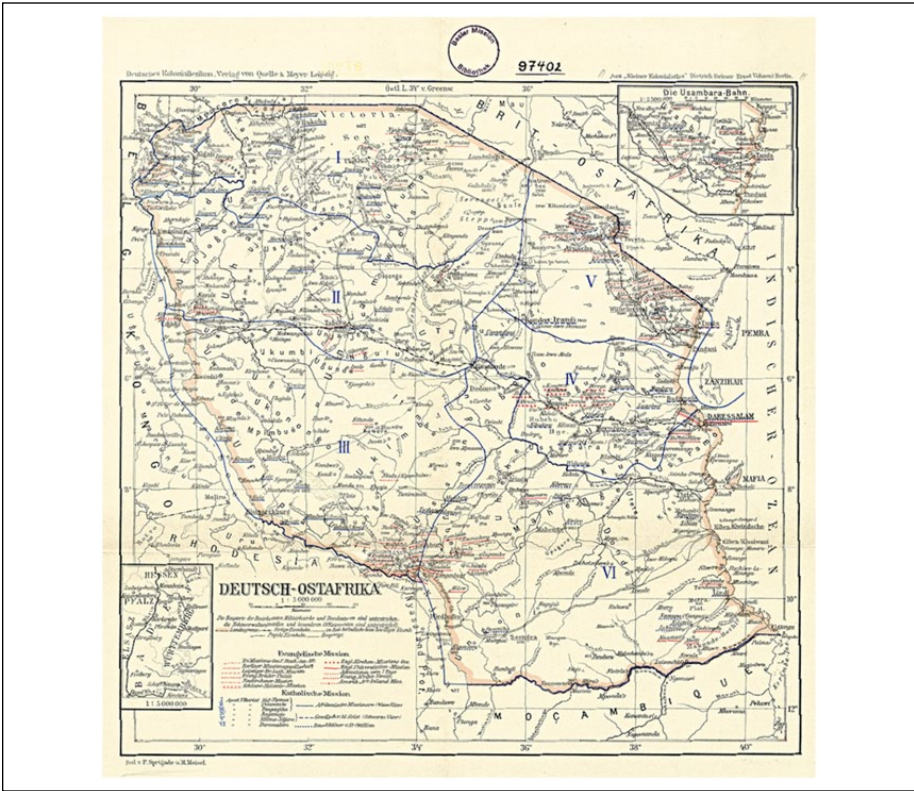


Figure A1. Map Detailing Catholic Missionary Societies Boundaries.

Note: See online version of this article to view figure in color.

Source: Sprigade and Moisel, "Deutsch-Ostafrika [Map]."

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Notes

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32. Ying Bai and James Kai-sing Kung, "Diffusing Knowledge While Spreading God's Message: Protestantism and Economic Prosperity in China, 1840–1920," *Journal of the European Economic Association* 13, no. 4 (2015): 669–98; Yuyu Chen, Hui Wang, and Se Yan, *The Long-Term Effects of Christian Activities in China* (Munich: Munich Personal RePEc Archive [MPRA], 2014).
33. Felipe Valencia Caicedo, "The Mission: Human Capital Transmission, Economic Persistence and Culture in South America" (unpublished paper, LSE, October 12, 2014): online at http://sites.bu.edu/neudc/files/2014/10/paper_320.pdf.
34. Okoye and Pongou, *Historical Missionary Activity*.
35. Okoye, *Things Fall Apart*.
36. See Mark Blackden, Sudharshan Canagarajah, Stephan Klasen, and David Lawson, "Gender and Growth in Sub-Saharan Africa: Issues and Evidence," Working Paper 37/2006 (Helsinki: UNU-WIDER, 2006); Dejo Olowu, "Gender Equality under the Millennium Development Goals: What Options for Sub-Saharan Africa?," *Agenda* 91, no. 26 (2012): 104–11; Stephanie Seguino and Maureen Were, "Gender, Development and Economic Growth in Sub-Saharan Africa," *Journal of African Economies* 23, AERC Supplement 1 (2014): i18–i61.
37. Charles Hattersley, *The Baganda at Home* (London: The Religious Tract Society, 1908); John Roscoe, *The Baganda: An Account of Their Native Customs and Beliefs* (London: MacMillan, 1911); Richard Reid, *Political Power in Pre-Colonial Buganda: Economy, Society and Warfare in the 19th Century* (Oxford: James Currey, 2002).
38. Alesina, Giuliano, and Nunn, "On the Origin of Gender Roles."
39. Catherine Coquery-Vidrovitch, *African Women: A Modern History* (Boulder, CO: Westview Press, 1997), 59–68.
40. Boserup, *Women's Role in Economic Development*, 178.
41. Akyeampong and Fofack, *The Contribution of African Women to Economic Growth and Development in the Pre-Colonial and Colonial Periods*.
42. Nunn, "Gender and Missionary Influence in Colonial Africa."
43. Felix Meier zu Selhausen and Jacob Weisdorf, "A Colonial Legacy of African Gender Inequality? Evidence from Christian Kampala, 1895–2011," *Economic History Review* 69, no. 1 (2015): 229–57; a similar study, Meier zu Selhausen, "Missionaries and Female Empowerment in Colonial Uganda," finds further evidence that Protestant missionaries actually improved the situation of women in Christian Uganda.
44. Lankina and Getachew, "Mission or Empire, Word or Sword?"
45. Anju Malhotra, Sidney Ruth Schuler, and Carol Boender, *Measuring Women's Empowerment as a Variable in International Development* (Paper prepared for the World Bank Workshop on Poverty and Gender, Washington, DC, 2002); Sunita Kishor, "Empowerment of Women in Egypt and Links to the Survival and Health of Their Infants," in Harriet Presser and Gita Sen, eds., *Women's Empowerment and Demographic Processes: Moving beyond Cairo* (New York: Oxford University Press, 2000), 204–38.
46. Bolt and Bezemer, "Understanding Long-Run African Growth"; Wantchekon, Klačnja, and Novta, "Education and Human Capital Externalities."

47. All translations in this work are my own.
48. Jutta Bückendorf, *"Schwarz-Weiss-Rot über Ostafrika!": Deutsche Kolonialpläne und Afrikanische Realität* (Münster: LIT Verlag, 1997); Reinhard Klein-Arendt, "Ein Land Wird Gewaltsam in Besitz Genommen: Die Kolonie Deutsch-Ostafrika," in Felicitas Becker and Jigal Beez, eds., *Der Maji-Maji-Krieg in Deutsch-Ostafrika, 1905–1907* (Berlin: Christoph Links, 2005), 28–58.
49. German contemporary sources mistakenly label the incident "the Arab Revolt" (*Araberaufstand*). Contrary to the German perception, the revolt was not an Arab affair, but united a number of peoples in the territory against DOAG. Michael Pesek, *Koloniale Herrschaft in Deutsch-Ostafrika: Expeditionen, Militär und Verwaltung Seit 1880* (Frankfurt: Campus Verlag, 2005).
50. John Iliffe, *A Modern History of Tanganyika* (Cambridge: Cambridge University Press, 1979); Pesek, *Koloniale Herrschaft in Deutsch-Ostafrika*.
51. Pesek, *Koloniale Herrschaft in Deutsch-Ostafrika*; Juhani Koponen, *Development for Exploitation: German Colonial Policies in Mainland Tanzania, 1884–1914* (Helsinki/Hamburg: LIT Verlag, 1995).
52. Felicitas Becker, "Traders, Big Men and Prophets: Political Continuity and Crisis in the Maji Maji Rebellion in Southeast Tanzania," *Journal of Development Studies* 45, no. 1 (2004): 1–22; Koponen, *Development for Exploitation*.
53. Iliffe, *A Modern History of Tanganyika*; Koponen, *Development for Exploitation*.
54. Akapo-Numado, "Mädchen- und Frauenbildung in den Deutschen Afrika-Kolonien." The civilizing mission, or "*mission civilisatrice*," played a pivotal role in the rationale for colonial intervention in France and Portugal; Pierre Paul Leroy-Beaulieu, quoted in Henri Brunschwig, *L'expansion Allemande Outre-Mer du XVe siècle à nos jours* (Paris: PUF, 1957), 33. However, the underlying motivations were spread all across Europe at this time, in particular among religious organizations. Notably, the abolitionist movement managed to stimulate missionary fervor and proved to be a highly successful recruitment strategy.
55. Pierskalla, De Juan, and Montgomery, "The Territorial Expansion of the Colonial State"; Peter Sebald, *Togo 1884–1914: Eine Geschichte der deutschen "Musterkolonie" auf der Grundlage amtlicher Quellen: mit einem Dokumentenanhang und 5 Karten Quellen* (Berlin: Akademie-Verlag, 1988). It should be noted that knowledge accumulation among the local population had existed long before the German arrival. But precolonial education was built on learning-by-doing and intergenerational transmissions of oral traditions; this was the first experience of indigenous groups with formal education. Iliffe, *Africans*.
56. Lord Hailey, *An African Survey* (Oxford: Oxford University Press, 1957); Frankema, "The Origins of Formal Education in Sub-Saharan Africa."
57. The colonial administration viewed missionaries as their primary tool for educating the youth and shaping "employees." Martin Schlunk, *Das Schulwesen in den Deutschen Schutzgebieten* (Hamburg: Friederichsen, 1914), 11. That view was a vital component of the colonial strategy, considering that the general attitude toward the East African colonies of the metropolitan political elite was that "*nicht die Produkte der Fauna und Flora, oder die Bodenschätze, sondern der schwarze Mann selbst*" (not the products of fauna and flora, nor the minerals in the earth are the most precious that East Africa contains, but the black man himself). Hans Meyer, "Zur Bevölkerungspolitik in Deutsch-Ostafrika" *Koloniale Zeitschrift* 1 (1900): 102–3, 102.

58. "Alles, was der christlichen Lehre Abbruch tun oder den Islam fördern könnte, ist zu vermeiden," Ramlow and Mgr Spreiter, *Drslm.*, 22.3.1913, Kopie im Archiv von St. Ottilien.
59. "[Funktionierten] fast ausschliesslich im Interesse der Kolonialpolitik. . . , indem sie dazu beitrugen, die europäische Kultur in Afrika einzuführen, was günstige Voraussetzungen für die politische Kolonisation und die wirtschaftliche Ausbeutung schaffte," Akakpo-Numado, "Mädchen- und Frauenbildung in den Deutschen Afrika-Kolonien," 22. This symbiotic relationship cannot be generalized to every phase of the colonial era. Missionary societies in the eighteenth and early nineteenth centuries acted quite independently of colonial states and vociferously criticized excessive violence and oppression. However, in the phase of high imperialism following the scramble for Africa, European missionaries in general acted as "*Agens und Partner*" (agents and partners) of European colonial conquests. Horst Gründer, *Christliche Mission und Deutscher Imperialismus. Eine Politische Geschichte Ihrer Beziehungen Während der Deutschen Kolonialzeit (1884–1914) unter Besonderer Berücksichtigung Afrikas und Chinas* (Paderborn: Schöningh, 1982), 323.
60. "Zucht und Ordnung, an Pünktlichkeit und Gehorsam, . . . Reinlichkeit und Disziplin," Carl Mirbt, *Mission und Kolonialpolitik in den Deutschen Schutzgebieten* (Tübingen, 1910), 157.
61. Norbert Weber, Benedictine missionary, in *Verhandlungen des Deutschen Kolonialkongresses, zu Berlin am 6., 7. und 8. Oktober 1910* (Berlin: D. Reimer, 1910), 674.
62. "Die Mission muß den Hauptdruck auf die Erziehung legen, nicht auf die Übermittlung von Kenntnissen"; Mirbt, *Mission und Kolonialpolitik in den Deutschen Schutzgebieten*, 156.
63. Amand Acker, "Die Soziale und Wirtschaftliche Tätigkeit der Katholischen Missionen," in D. Schneider, ed., *Jahrbuch über die Deutschen Kolonien* (Essen: Baedeker, 1910), 148–68, 149.
64. Flora Myamba, "Domestic Violence Rights Movement in Tanzania: An Exploration" (PhD dissertation, Western Michigan University, Kalamazoo, 2009).
65. James Brain, "Down to Gentility: Women in Tanzania," *Sex Roles* 4 (1978): 695–715.
66. Ilse Hanak, *Frauen in Afrika:—ohne uns geht gar nichts!* (Wien: Brandes & Apels, 1995); Jakob Spieth, *Die Ewe-Stämme, Material zur Kunde des Ewe-Volkes in Deutsch-Togo* (Berlin: D. Reimer, 1906); Martha Mamozai, *Schwarze Frau, Weiße Herrin: Frauenleben in den Deutschen Kolonien* (Reinbek: Rowohlt, 1989).
67. At the time, the *modus operandi* when it came to women's representation was that "the state recognizes a burgher but not a burgess." Ede Sagarra, *A Social History of Germany, 1648–1914* (New York: Holmes & Meier, 1977), 408. Despite these restrictions, women's rights movements were growing during the Wilhelmine era in Germany, and during the period under study women's emancipation increased considerably. However, it is unlikely that these social and political processes influenced the gender ideals of missionaries in the colonies during this period.
68. Irene Fiedler, *Wandel der Mädchenerziehung in Tansania: Der Einfluss von Mission, Kolonialer Schulpolitik und Nationalem Sozialismus* (Saarbrücken: Breitenbach, 1983); Simone Prodolliet, "Missionarinnen, Missionierte und das Europäische Frau- Enideal," *Bildung und Erziehung* 46, no. 3 (1993): 299–313; Christel Adick and Wolfgang Mehnert, *Deutsche Missions- und Kolonialpädagogik in Dokumenten: Eine Kommentierte Quellensammlung aus den Afrikabeständen Deutschsprachiger Archive 1884–1914* (Frankfurt: IKO-Verlag für Interkulturelle Kommunikation, 2001).

69. Missionaries frequently argued that the education of women among pagan people practicing polygamy was among their core tasks. Martin Schlunk, *Die Norddeutsche Mission in Togo II: Probleme und Aufgaben* (Bremen: Verlag der Norddeutschen Missions-Gesellschaft, 1912), 98.
70. Mamozai, *Schwarze Frau, Weiße Herrin*, 66.
71. Dagmar Konrad, *Missionsbräute: Pietistinnen des 19. Jahrhunderts in der Basler Mission* (Münster: Waxmann, 2001); Hilke Ostenwald-Rytlewski, *Die Diakonissenarbeit in der Norddeutschen Mission*, insbesondere ihr Einsatz in Westafrika bis zum Ersten Weltkrieg (Wiegboldsbur: Verlagshaus Wiegboldsbur, 1987).
72. Schlunk, *Das Schulwesen in den Deutschen Schutzgebieten*; Franz Schächli, "Die Katholischen Missionsschulen des Tanganyika-Gebietes" (Universität Münster, 1935), 22.
73. Schächli, "Die Katholischen Missionsschulen des Tanganyika-Gebietes," 36.
74. Adick and Mehnert, *Deutsche Missions- und Kolonialpädagogik in Dokumenten*; Akapko-Numado, "Mädchen- und Frauenbildung in den Deutschen Afrika-Kolonien."
75. "Die Mädchen werden unter Aufsicht der Schwestern in den ihrem Stand gemäßen Haushaltsarbeiten unterrichtet," in *Anlagen zur Denkschrift über die Entwicklung d. deutschen Schutzgebiete 1902/03*, 34.
76. Boserup, *Women's Role in Economic Development*; Gaitskell, "Devout Domesticity? A Century of African Women's Christianity in South Africa"; van Allen, "Sitting on a Man"; Comaroff and Comaroff, "Home-Made Hegemony"; Nakanyike Musisi, "Morality as Identity: The Missionary Moral Agenda in Buganda, 1877–1945," *Journal of Religious History* 23, no. 1 (1999): 51–74; Modupe Labode, "From Heathen Kraal to Christian Home: Anglican Mission Education and African Christian Girls, 1850–1900," in Fiona Bowie, Deborah Kirkwood, and Shirley Ardener, eds., *Women and Missions: Past and Present* (Oxford: Berg, 1993), 126–44.
77. This is reflected, for example, in a statement by Protestant missionary leader Zinzendorf, who proclaimed the directive to "create disciples among the people" (*Jünger machen unter den Völkern*). Erich Beyreuther, *Studien zur Theologie Zinzendorfs: Gesammelte Aufsätze* (Zürich: Speyer & Peters, 2000), 157).
78. Karl Schneider, *Jahrbuch über die deutschen Kolonien 1913* (Essen: Baedeker, 1913), Statistical Annex 10–13.
79. Johannes Hoekendijk, *Kirche und Volk in der Deutschen Missionswissenschaft* (München: Christian-Kaiser, 1967), 51.
80. This policy remained unchanged until Vatican II in 1965.
81. Becker and Woessmann, "Was Weber Wrong?," 27.
82. Schächli, "Die Katholischen Missionsschulen des Tanganyika-Gebietes," 95.
83. Wantchekon, Klačnja, and Novta, "Education and Human Capital Externalities."
84. Online at <http://dhsprogram.com/publications/publication-fr243-dhs-final-reports.cfm>.
85. Online at <http://dhsprogram.com/What-We-Do/Survey-Types/AIS.cfm>.
86. National Bureau of Statistics [Tanzania], *Tanzania HIV/AIDS and Malaria Indicator Survey 2007–08* (Dar es Salaam: Macro International, 2008); National Bureau of Statistics [Tanzania], *Tanzania Demographic and Health Survey 2010* (Dar es Salaam: ICF Macro, 2011); National Bureau of Statistics [Tanzania], *Tanzania HIV/AIDS and Malaria Indicator Survey 2011–12* (Dar es Salaam, ICF International, 2013).
87. Schlunk, *Das Schulwesen in den Deutschen Schutzgebieten*.

88. Ibid., III. "Hätte ich mit der Veröffentlichung der Ergebnisse warten wollen, bis alle Zahlen zusammen waren und wirkliche Vollständigkeit erreicht war, so wären die Zahlen entweder völlig veraltet und wertlos oder überhaupt nicht der Öffentlichkeit zugänglich geworden. Ich lege das Material deshalb so vor, wie es ist. Es bleibt auch so trotz seiner Mängel das zuverlässigste, was zur Zeit zu erreichen war" (If I had delayed the publication of results until I had complete information, this information would have been outdated and worthless or not available to the public. Therefore I present the material as it is. In spite of its shortcomings, it is still the most reliable information that is available at this time).
89. QGIS version 2.10.1 is described at, and may be downloaded from, <http://www.geology-page.com/2015/10/qgis-version-2-10-1.html>.
90. Paul Sprigade and Max Moisel, eds., "Deutsch-Ostafrika [Map]," in *Der Grosse Deutsche Kolonialatlas 1920* (Braunschweig: Archiv Verlag, 2002), scale: 1:1.000.000.
91. I have tested the models with a similar measure for 50 km and 100 km. The results remain robust in that they remain statistically significant and maintain their direction.
92. William Roome, "Ethnographic Survey of Africa: Showing the Tribes and Languages; Also the Stations of Missionary Societies" [Map] (London: Edward Stanford Ltd, 1925), scale: 1:5,977,382.
93. Nunn, "Gender and Missionary Influence in Colonial Africa"; Okoye and Pongou, *Historical Missionary Activity*.
94. Hildegard Johnson, "The Location of Christian Missions in Africa," *Geographical Review* 57, no. 2 (1967): 168–202; Nunn, "Religious Conversion in Colonial Africa."
95. This is summed up by the contemporary missionary Alexander Merensky, who advised the Berlin mission to establish a presence in the Njassa region because of its healthy climate and indigenous population "untouched by the influence of Arabs and Europeans." Alexander Merensky, *Der Nyassa-See als Gebiet für Deutsche Missionstätigkeit* (Berlin, 1890), 26.
96. Pierskalla, De Juan, and Montgomery, "The Territorial Expansion of the Colonial State."
97. Ibid. Appendix Tables A2 and A3 further contains two replications of the initial regression analysis that highlight the negligible effect of administrative stations on relevant outcomes. While the former indicates that administrative stations are statistically insignificant, the second table displays the results without administrative stations as a control variable. Considering that the obtained results differ only marginally from those displayed in Table 1, it can be assumed that there is no systematic relationship between administrative stations and the relevant outcomes.
98. Ibid.
99. Schäppi, "Die Katholischen Missionsschulen des Tanganyika-Gebietes."
100. Ibid.
101. Linda Mhando, "Tanzania and the Geo-Politics of Rural Development: The Return of Neoliberalism," *Journal of Emerging Knowledge on Emerging Markets* 3 (2011): 1–19.
102. US Geological Survey, "Shuttle Radar Topography Mission One-Kilometer-Resolution Data"; online at <https://lta.cr.usgs.gov/SRTM1Arc>.
103. *Statistisches Jahrbuch für das Deutsche Reich* [Statistical Almanac for the German Reich], issued by Kaiserliches Statistisches Amt, 1880–1918 (Berlin: Puttkammer & Mühlbrecht, 1880–1914).
104. Josef Marner, *Die Klimatischen Bedingungen für die Siedlung von Nordeuropäern in den Tropen* (Hamburg: Hammerich & Lesser, 1940).
105. Online at <http://www.worldclim.org/>. Robert Hijmans, Susan Cameron, Jorge Parra,

- Peter Jones, and Andy Jarvis, "Very High Resolution Interpolated Climate Surfaces for Global Land Areas," *International Journal of Climatology* 25 (2005): 1965–78.
106. Information on the tsetse fly population can be found in Heinrich Schnee, "Tsetsefliegenaufkommen in Deutsch-Ostafrika" [Map], *Deutsches Koloniallexikon 1920*: 1:5.000.000. The map includes 1,357 individual points representing tsetse fly density. I have digitized these points and calculated counts per ward-cell.
 107. G. Fischer et al., *Global Agro-Ecological Zones Assessment for Agriculture (GAEZ 2008)* (Rome: FAO, 2008).
 108. Estimates for indigenous population density can be found in Heinrich Schnee, "Bevölkerungsdichte in Deutsch-Ostafrika" [Map], *Deutsches Koloniallexikon 1920*: 1:15.000.000. Although the map does not provide a reliable source for accurate numerical estimates of the actual population density it can be used to indicate roughly areas of relatively higher or lower density. I have attributed ascending numbers for the four density levels to each ward-cell according to spatial overlaps of the ward-centroid.
 109. Daron Acemoglu, Simon Johnson, and James A Robinson, "The Colonial Origins of Comparative Development: An Empirical Investigation," *American Economic Review* 91, no. 5 (2001): 1369–1401.
 110. Ernst Nigmann, *Geschichte der Kaiserlichen Schutztruppe für Deutsch-Ostafrika* (Hamburg: E.S. Mittler, 1911).
 111. Nunn, "Gender and Missionary Influence in Colonial Africa."
 112. See Woodberry, *The Shadow of Empire*; Nunn, "Gender and Missionary Influence in Colonial Africa."
 113. Gallego and Woodberry, "Christian Missionaries and Education in Former African Colonies."
 114. Becker and Woessmann, "Was Weber Wrong?"; Woodberry, "The Missionary Roots of Liberal Democracy."
 115. A weaker effect of the historic treatment on average years of education may also be related to the massive expansion of public schools during the later years of the socialist regime in Tanzania. Although this policy direction has been weakened in recent years, Tanzania was close to attaining universal education, thereby considerably reducing variation in any variable simply measuring access. However, the emphasis on a quantitative expansion of education opportunities also reduced the quality of education provided. Laura McCloskey, Corrine Williams, and Ulla Larsen, "Gender Inequality and Intimate Partner Violence among Women in Moshi, Tanzania," *International Family Planning Perspectives* 31, no. 3 (2005): 124–30, 128. With more people attending school, a decreased quality of education induces more variability in outcomes measuring effective education.
 116. Roome, "Ethnographic Survey of Africa."
 117. D. Engel, *Missionsmethode der Missionare vom Heiligen Geist auf dem Afrikanischen Festland* (Knechtsteden: Neuss, 1932), 110.
 118. Schäppi, "Die Katholischen Missionsschulen des Tanganyika-Gebietes," 7.
 119. *Ibid*, 61.
 120. J. Schmidlin, *Die Katholischen Missionen in den Deutschen Schutzgebieten* (Münster: Aschendorff, 1913), 129; Schäppi, "Die Katholischen Missionsschulen des Tanganyika-Gebietes," 80.
 121. Schäppi, "Die Katholischen Missionsschulen des Tanganyika-Gebietes," 112.

122. Ibid, 30.
123. Bolt and Bezemer, "Understanding Long-Run African Growth"; Wantchekon, Klačnja, and Novta, "Education and Human Capital Externalities."
124. Meier zu Selhausen and Weisdorf, "A Colonial Legacy of African Gender Inequality?"
125. Okoye and Pongou, *Historical Missionary Activity*; Meier zu Selhausen, "Missionaries and Female Empowerment in Colonial Uganda."
126. Alesina, Giuliano, and Nunn, "On the Origin of Gender Roles."
127. Pierskalla, De Juan, and Montgomery, "The Territorial Expansion of the Colonial State."
128. Enrico Spolaore and Romain Wacziarg, "How Deep Are the Roots of Economic Development?," *Journal of Economic Literature* 51, no. 2 (2013): 325–69.

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